NOTEBOOK COMPUTER

USER'S GUIDE

Notebook Computer

User's Guide

Manual edition 2.0, November 1995

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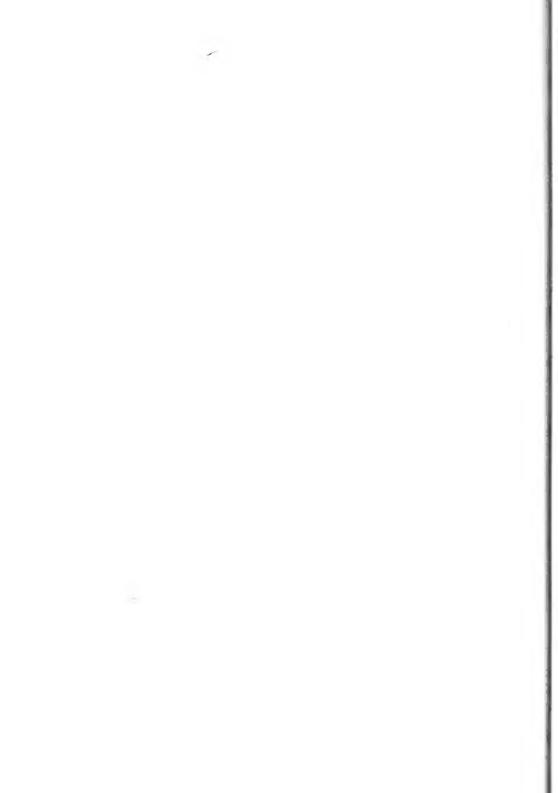
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Notices

FEDERAL COMMUNICATIONS COMMISSION RADIO FREQUENCY INTERFERENCE STATEMENT

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instruction manual may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.

- Increase the separation between the equipment and receiver.

- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

- Consult the dealer or an experienced radio TV technician for help.

Notice:

(1) The changes or modification not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

(2) Shielded interface cables and AC power cord must be used in order to comply with emission limits

(3) This equipment is to be used with power supply "Asian"type APD-9510-19A or "Ilan" type F1560.

CANADIAN DOC NOTICE FOR CLASS B COMPUTING DEVICES

This digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulation of the Canadian Department of Communications

"Le présent appareil numérique n'èmet pas de bruits radioélectriques d'epassant les limites applicables aux appareils numériques de la class B prescrites dans le Règlement sur le brouillage radioélectrique édictè par le ministère des Communications du Canada"

Safety Precautions

This section is designed to assist you in identifying potentially
unsafe conditions while working with this product. Required
safety features have been installed in the computer to protect you
from injury. However, you should use good judgment to identify
potential safety hazards:

- Read all of these instructions before use and save them for
  later use.

- Follow all warnings and instructions marked on the product.

- Unplug this product from the wall outlet before cleaning Do
  not use liquid or aerosol cleaners To clean, wipe with a
  damp cloth

- Do not use this product near water.

- Do not place this product on an unstable cart, stand, or table. The product may fall, causing serious damage to the product.

- Slots and openings in the cabinet are for ventilation. To ensure reliable operation of the product and to protect it from overheating, these openings must not be blocked or covered. This product should never be placed near or over a radiator or heater.

- Never push objects of any kind into this product through cabinet slots, as they may touch dangerous voltage points or short out parts that could result in fire or electric shock. Never spill liquid of any kind on the product.

- This product should be operated from the type of power source indicated on the marking label. If you are not sure of the type of power available, consult your dealer or local power company.

- This product is equipped with a 3-wire grounding-type plug. This plug only fits into a grounding-type power outlet. This is a safety feature. If you are unable to insert the plug into the outlet, contact your electrician to replace your outlet. Do not use an adapter of any kind.

- If you use an extension cord with this product, make sure that the total of the ampere ratings on the products plugged into the extension cord does not exceed the extension cord ampere rating. Also, make sure that the total of all products plugged into the wall outlet does not exceed 15 amperes.

- Adjust only those controls that are covered by the operating instructions, since improper adjustment of other controls may result in damage and may require extensive work by a qualified technician to restore the product to normal operation.

- Do not attempt to service this product yourself, as opening or removing the cabinet may expose you to dangerous voltage or other risks. Refer all servicing to service personnel.

- Unplug this product from the wall outlet and refer servicing to qualified service personnel under the following conditions:

  - If the power cord or plug is damaged or frayed;

  - If liquid is spilled into the product;

  - If the product has been exposed to rain or water;

  - If the product does not operate normally when the operating instructions are followed;

  - If the product has been dropped or the cabinet has been damaged;

  - If the product exhibits a distinct change in performance, indicating a need for service.

- Turn off the computer before connecting a peripheral device.

- Replace the battery pack only with the same type as the original. Use of another battery pack may present a risk of fire or explosion.

WARNING: *The battery pack may explode if mistreated. Do not disassemble the battery or dispose of it in fire. Keep away from children and dispose of the used battery promptly.*

Wichtige Sicherheitshinweise

- Diese Hinweise sollten vollständig durchgelesen werden.

- Diese Hinweise für einen späteren aufbewahren.

- Allen auf dem Gerät angebrachten Warnungen und Hinseisen folgen.

- Vor dem Reinigen das Netzgerätes Netzstecker ziehen. Keine Flüssigreiniger oder Sprühreiniger verwenden. Zum Reinigen ein angefeuchtetes Tuch benutzen.

- Das Netgerät nicht in feuchten Räumen verwenden.

- Auf der oberzeite des Gehäuses des Netsgerätes befinden sich Beluftungsöffnungen. Für einen sicheren Betrieb und zum schutz vor Überhitzung ist sicherzustellen, daß diese Öffnungen nicht abgedeckt werden.

- Das Netzgerat ist mit einem dreiadrigen Netzstecker mit Erdeung ausgestattet. Der geerdete Netzstecker bietet einen sicheren Schutzleiteranschluß für das Gerät. Dies ist eine Sicherheitzmaßnahme. Falls der Stecker nicht in die Steckdose eingesteckt werden kann, sollte ein Elektriker die alte Steckdose gegen eine neue austauchen. Nicht den Sicherhieitszweck des geerdeten Netzsteckers umgehen.

- Der Stecker des Netzkbels wird zum Abtrennen des Gerätes von der Stromversorgung verwendet. Die Steckdose sollte in der Nähe des Gerätes installiert und einfach zuggäanlich sein.

- Der Notebook computer ist nur mit dem vom Hersteller angegebenem Netzgerät zu betreiben.

- Die Batterie des Notebook compputes ist nur durch eine vom gleichen Tupe zu ersetzen, wie vom Hersteller empfohlen. Die Verwendung einer anderen Batterie kann Feuer oder Explosion zur Folge haben, Die Batterie sollte vom Kundendienst ausgewechselt werden.

• Dieses Gerät enthält Nickel-Cadmium-Akkus. Im Interesse des Umweltshutzes bitte nicht am Ende seiner Lebensdauer mit dem Haumüll entsorgen. Eine Entsorgung kann über eine Kundendienststelle oder entsprechende Sammelstellen -- nach nationalen Vorschriften – erfolgen.

WARNUNG: *Die Batterie kann bei falscher Handhabung explodieren. Nicht aufladen, zerlagen oder in offenes Feuer werfen. Von Kindern fernhalten und gebrauchte Batterien sofort beseitigen.*

About This Manual

This manual contains information to help you get the best from your notebook computer. Whether you are a new or experienced computer user, you will benefit more from this manual if you are familiar with its organization. This manual contains eight chapters, appendices, and an index.

Chapter 1: "Introduction," lists the special features of your notebook computer and available options. It also describes unpacking the computer and provides information about the computer's operating environment.

Chapter 2: "Getting Started," shows you the location of important items on the computer and gives you step-by step procedures for setting up and starting the computer. It discusses using the battery pack and connecting peripheral devices to the computer.

Read this chapter whether you are new to computers or you are an experienced computer user. If you have used a computer before, the information in this chapter should be enough to let you start using your computer.

Chapter 3: "Using the Notebook Computer," instructs you in using the special features of the notebook computer.

Chapter 4: "Running the System Setup," tells you how to operate the Setup Utility that is provided in the computer's ROM BIOS.

Chapter 5: "The Software Utilities Disks," tells you how to install and use the software utilities that come with your computer, including the Pointing Device (TouchPad, Trackball, or Stick Pointer) Driver, the PMU (Power Management Utility), the VGA drivers, and the SETCOL utility.

Chapter 6: "CardSoft PCMCIA Software Suite," describes the PCMCIA solution for expanding your computer functionality with memory, mass storage, LAN, fax/modem, and wireless communications.

Chapter 7: "Caring for Your Computer," offers tips for taking care of your computer and preventing problems.

Chapter 8: "Troubleshooting," suggests ways to locate and solve common problems.

Appendix A: "Hard Disk Drive Types," lists the default hard disk drive parameters that are shipped with the system BIOS.

Appendix B: "Using PHDISK.EXE," describes using the Suspend to Disk Data File Allocation utility to create the Suspend to Disk data file.

Appendix C: "Specifications," lists the system specifications, including the electrical, mechanical, operating environment, and software specifications.

In addition to this manual, you will also want to the consult manuals for your operating system and application software.

Manual Conventions

The following conventions are used throughout this manual:

- Bullets (for example, this one) present lists of information or items in a list of alternatives.

- Numbered procedures guide you through sequential steps. The beginning of a procedure is indicated by the ➲ symbol.

- *Italics* show you characters you type and book titles. Italicized terms are described in the glossary.

- Notes contain important information that is set off from the text.

- Caution messages appear before procedures which, if not observed, could result in loss of data or damage to equipment.

- "TouchPad" represents the TouchPad, Trackball, or Stick Pointer
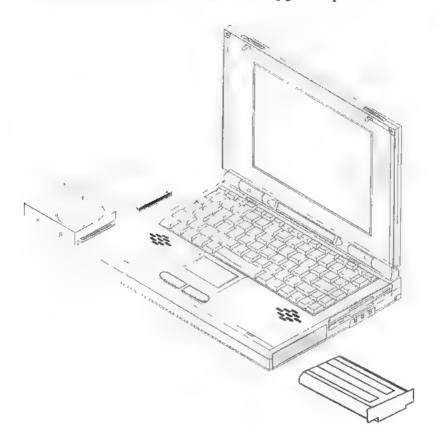
1 Introduction

This chapter introduces the special features of your high-performance monochrome or color notebook computer. It also describes unpacking the computer.

Your notebook computer is lightweight, compact, and fully compatible with software and hardware products designed for IBM PC/AT and compatible personal computers. The computer is designed for a wide range of personal productivity, multimedia, presentation, and business applications, including memory-intensive applications. With its rechargeable battery pack and high-speed performance, the computer is the ideal choice for use in the office, at home, and on the road.

Best of all, the computer provides extensive upgrade options, including: removable LCD panel, removable hard disk drive & replaceable floppy disk drive, PCMCIA support, and optional docking station.

Figure 1. The notebook computer & upgrade options.

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1.1 Features

Your notebook computer includes the following advanced features:

- **Central Processing Unit:**
  - High-performance P54C or P54LM CPU

- **System Memory:**
  - 8MB of on-board memory
  - Memory expandable to 16MB, or 24MB (with optional 8MB or 16MB expansion RAM module)

- **Replaceable VGA Color LCD Panel:**
  - 9.4 inch (24.1 cm) or 10.4 inch (26.6 cm) wide non-glare display area
  - 640 x 480 pixel resolution with 256 colors
  - VESA local bus

    External monitor support with simultaneous internal and external display.
  - 1MB of video memory

- **Full-Function 85- or 86-key Keyboard:**
  - Embedded numeric keypad
  - 12 programmable function keys
  - Inverted "T" cursor control key layout

- **Built-in Dual-button TouchPad, Stick Pointer, or Trackball:**

    Hardware-compatible with the IBM PS/2 mouse

- Software-compatible with the Microsoft mouse mode

- **Input/Output Connectors:**

  - Serial port (1)

  - Bi-directional enhanced parallel port (1)

    Connector for external PS/2 keyboard/numeric keypad

  - Connector for external VGA monitor

- Infrared Serial Port

  - Docking station connector

- **PC Card Sockets:**

  You can expand your computer's capabilities by adding PCMCIA type I, type II, and type III PC cards. The computer's two PC card sockets support the following features:

  - Support for memory cards, I/O cards, PCMCIA-ATA hard disks, and semiconductor disks

  - Allows changing of PC cards without rebooting the system

- **Removable Hard Disk Drive:**

    Includes a removable 2.5-inch IDE hard disk drive (19mm in height)

  - 340MB, 450MB, 510MB 720MB, or 810MB capacity

  - Automatic detection of IDE drive type

- **AC Adapter:**

  - 100 ~ 240V wide range compatibility

- **Rechargeable Battery Pack:**

  Uses NiMH batteries

  - Supplies at least 2 hours of continuous operation on a full charge

  Automatic battery recharging: fully recharges in 2 hours when the computer is off

  - Trickle charging to keep battery power full: auto-switching to trickle charging when the battery is fully charged or the computer is on

  Low battery warning

  Automatic switching with AC adapter

  Power Management Control features conserve battery power

- **Intelligent Power Management Control Features:**

  To reduce power consumption and heat generation, your computer includes the Normal, Doze, Sleep, and Suspend power management modes. This operation is transparent to the user and no additional software is required.

- **Weight and Size:**

  - Weight: 2.8 kgs (including the battery pack)

  - Compact size:

  DSTN: 290mm x 220mm x 49mm (11.4" x 8.7" x 1.9")

  TFT: 290mm x 220mm x 51mm (11.4" x 8.7" x 2.0")

- **And More...**

  - The extended keyboard base provides extra support for your wrists while you are typing.

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— Licensed BIOS

Note·   Because the notebook computer is available in different configurations, some of the features mentioned in this manual might not be included on your computer or may differ slightly.

1.2   Unpacking

Your notebook computer comes securely packaged in a sturdy cardboard shipping carton. Upon receiving your computer, open the carton and carefully remove the contents.

After unpacking, carefully inspect each component to make sure that nothing is damaged. If any of these materials is damaged, contact the dealer from whom you purchased your computer.

Save the shipping materials and carton in case you want to ship or store the computer in the future. You should also keep your sales receipt for warranty verification in case you need to have your computer serviced.

What You Have

In addition to this *User's Guide*, the notebook computer's shipping carton should include the following items.

- The notebook computer
- A battery pack
- The AC adapter
- A power cord
- A carrying bag
- Software Utility disks

Options

The following optional items are available from your dealer:

- Docking station
- PC cards (type I, type II, or type III)
- Expansion RAM
- External Numeric keypad
- Spare battery pack
- Trackball or Stick pointer (exchangeable with the TouchPad)
- External battery charger
- DOS & Microsoft Windows

1.3   Operating Environment

You can use your computer under a wide range of environmental conditions. However, to ensure long use and continued high performance, consider the following factors when setting up your computer:

- Set the computer on a flat, stable surface. To prevent damage to the computer's hard disk drive, avoid using the computer where it will be exposed to strong vibration.

- Locate the computer away from electromagnetic or radio frequency interference (for example, television/stereo sets, copying machines, and air conditioners).

- Avoid using or storing the computer where it will be exposed to extreme temperatures. In particular, do not leave the computer in direct sunlight, over a radiator, or near a heat register for a long period of time. High temperature tends to damage the electronic circuitry.

- Avo.d using or storing the computer where it will be exposed to high or low humidity. Extreme humidity can contribute to disk drive failure.

- If you are using the computer with the AC adapter, do not allow anything to rest on the power cord. Do not place the computer where people can step on or trip over the cord.

- The openings on the computer are provided to protect the computer from overheating. To ensure reliable operation, leave about 10 cm (4 inches) around the computer for air circulation.

- Avoid placing the computer where there will be dust or smoke in the air.

2 Getting Started

This chapter guides you in getting your notebook computer up and running.

2.1 Getting to Know the Notebook Computer
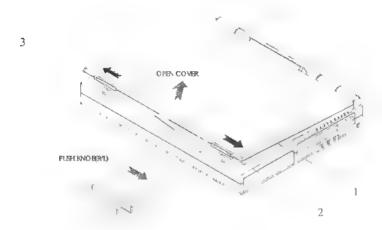
Before you set up your computer, take a few minutes to become familiar with its features. This section shows you how to open the LCD screen and introduces the computer's major features.

Opening the LCD Screen

The notebook computer is equipped with a color Liquid Crystal Display (LCD) screen. Depending on the model of your computer, the LCD screen and VGA display circuitry let you view text and graphic information in color Backlighting allows you to comfortably view the screen even when ambient lighting is low.

Open the LCD screen by sliding the latches on the front of the computer outward and raising the screen.

Figure 2. Opening the LCD screen.

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OPEN COVER

PUSH KNO B(R/L)

2

After opening the screen, you can adjust it to any angle that is comfortable for you.

You can also connect an optional external VGA color display monitor to the VGA monitor connector on the rear panel of the computer. When you have connected an external monitor, the computer lets you simultaneously operate the LCD screen and the external monitor. For a description of connecting an external monitor, see the section later in this chapter.

Front View

With the LCD screen open, you will see several features important for operating your notebook computer, including:

- The TouchPad
- The keyboard
- The LCD indicator panel

Each of these features is briefly described below. The keyboard is described in the next chapter.

The TouchPad

The built in TouchPad is a convenient substitute for a two-button mouse: the left TouchPad button is equivalent to the left mouse button; the right TouchPad button is equivalent to the right mouse button.

You can use the TouchPad with Microsoft Windows as well as non-Windows applications.

- To use the TouchPad with Microsoft Windows, set up Windows to use the Microsoft, IBM PS/2 mouse driver, or the attached TouchPad driver.

- To use the TouchPad with a non-Windows application, install the TouchPad driver found on the Software Utilities disk (for a description, refer to Chapter 5).

Note: Instead of a TouchPad, your computer may be equipped with a stick pointer or trackball.

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The Keyboard

Your computer uses an 85- or 86-key enhanced keyboard. The keyboard is the primary method of communicating with the computer. You can use your keyboard to enter text and navigate through a screen display. Since you will be spending a good deal of time at the keyboard, it is a good idea to familiarize yourself with its layout.

For a detailed description of the keyboard, see the next chapter.

The LCD Indicator Panel

The LCD indicator panel, located below the LCD screen, keeps you informed of the computer's operating status.

These icons are described below, from left to right.

Figure 2. LCD Indicator Panel.

Table 1. LCD indicator panel.
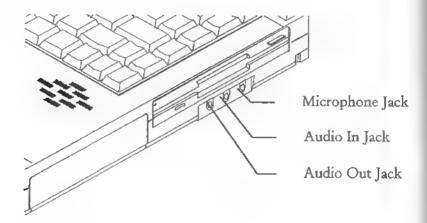
Icon	Description
	Indicates when the computer is plugged in via the AC adapter.
	The battery icon appears whenever the power is turned on and the battery is installed. The number of solid bars shown inside the battery icon indicates how much charge is in the battery.

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Icon	Description
🔒	Indicates when any of the Lock functions (ie: Caps Lock, Num Lock, Pad Lock, Scroll Lock) is in use.
1	Indicates that the keyboard is in NUM LOCK mode. See Chapter 3 for a description of this mode.
A	Indicates when the keyboard is in Caps Lock mode. In this mode, the keyboard produces uppercase text when you press a key. When you press the Caps Lock key again, the indicator goes off and the keyboard produces lowercase text.
↓	Indicates when the keyboard is in Scroll Lock mode. Some applications will move information across the screen differently when Scroll Lock is on.
⠿	Indicates that the Pad Lock function is enabled. (simultaneously press the Fn and Num Lock keys to toggle this function on and off). See Chapter 3 for a description of the Pad Lock function and the Fn key.
🛢	Indicates that the computer is accessing the hard disk drive.
💾	Appears when the computer is accessing the floppy disk drive.
▯	Indicates when the computer is accessing a PC card. See Chapter 3 for a description of using PC cards
Z^z	Indicates when the computer is in Suspend mode. See Chapter 3 for a description of this mode.

Right Side View

The floppy disk drive, the audio jacks, and the battery pack compartment are located on the right side of the computer.

Figure 4. The right side view.

Microphone Jack

Audio In Jack

Audio Out Jack

Floppy Disk Drive

The floppy disk drive is capable of reading and writing 3.5" 1.44MB floppy diskettes. When the floppy disk drive (FDD) is reading from or writing to a disk, the FDD icon on the LCD indicator panel will come on

Audio In/Out Jacks

Just below the floppy disk drive, there are three 1/8" (3.5mm) audio jacks. These are for microphone input, line input, and speaker output.
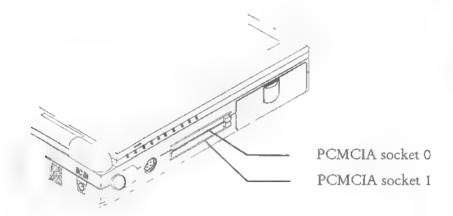
The Battery Pack Compartment

The computer's battery pack is installed in this compartment. For a description of removing the battery pack, see the next chapter.

Left Side View

The left side of the computer contains the following features: the power switch, the external keyboard connector, the PCMCIA sockets, and the removable hard disk drive.

Figure 5. The left side view.

PCMCIA socket 0

PCMCIA socket 1

The Power Switch

Press the power switch to turn the computer on and off. When the computer is turned on, the Power icon on the LCD indicator panel will come on.

The External Keyboard Connector

Plug the connector from an external keyboard or numeric keypad into this socket.

This connector only accepts an external keyboard with a 6-pin (PS/2-compatible) connector. To connect a keyboard

with a 5-pin connector, use a 5-pin to 6-pin transfer cable (available from your dealer).

Note: *You can operate both the internal keyboard and an external keyboard at the same time.*

The PCMCIA Sockets

The computer's PCMCIA sockets let you extend the capabilities of your computer by inserting PC cards. There are a wide variety of PC cards available, including: data storage, fax/modem, Local Area Network (LAN), wireless communication cards, and more. See the description of using PC cards in the next chapter.

The computer has two PCMCIA type II connectors (or one PCMCIA type III connector). The upper socket is PCMCIA socket "0"; the lower socket is socket "1". The upper ejection button is for socket "0"; the lower button is for socket "1".

For a detailed description of using PC cards, see Chapter 3.

Removable Hard Disk Drive

The removable hard disk drive is installed in this compartment. For a description of replacing the hard disk drive, see the next chapter.
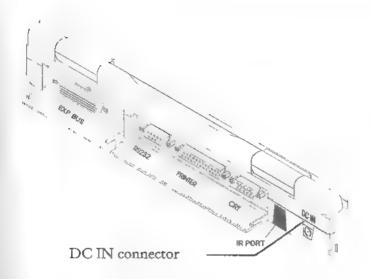
Rear Panel View

The rear panel of the computer contains the following features:

- Docking Station connector
- The serial port (RS-232)
- The parallel port (printer port)
- The external VGA port
- The infrared (IR) data transfer port
- The DC IN connector

Each of these features is briefly described below.

Figure 6. The rear panel view.

DC IN connector

The Docking Station Connector

Connect an optional docking station into this 240-pin connector.

The RS-232 Port

Plug a serial printer, mouse, or other serial device into this 9-pin port.

The Parallel Port

Plug a parallel printer into this 25-pin bi-directional female port.

The External VGA Port

Connect an optional external VGA display monitor into this 15-pin female connector.

The Infrared Data Port

You can use this port to transfer large amounts of data very quickly to any other machine which is also equipped with an IrDA-compliant IR port.
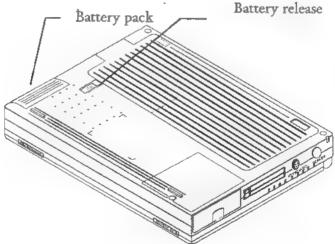
The DC IN Connector

Plug the AC adapter into this connector.

Bottom View

The release switches for the battery pack, removable hard disk drive are located on the bottom of the computer.

Figure 7. The bottom view.

Battery pack   Battery release

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2.2 Connecting to a Power Source

You can use the provided AC adapter to supply your computer with power from an AC wall outlet. Your computer also comes with a rechargeable battery pack that lets you use the computer without an external power source.

Connecting the AC Adapter

Use the provided AC adapter to supply your computer with power from an AC wall outlet. You can also use the AC adapter to charge the computer's battery pack (for more information on charging the battery pack, refer to "Charging the Battery Pack" later in this chapter).

The AC adapter converts high-level AC voltage to the much lower level DC voltage appropriate for the computer. The adapter's AC input voltage can range anywhere from 100 to 240 volts, covering the standard voltages available in almost every country.

The power cord for the AC adapter requires a three-hole grounded AC outlet. An optional four- or six-plug power strip is a convenient addition, especially if you have only one wall plug and several devices that need electricity. You can buy power strips with built-in electrical surge protection. This provides limited protection from glitches in the local voltage that can cause loss of data.
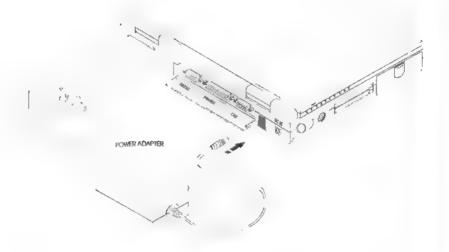
➲ *To connect the computer to an external power source:*

1. Place the computer so that you have access to its rear panel.

2. Plug the AC adapter's connector into the DC IN connector on the rear panel of the computer.

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3. Connect the power cord from the AC adapter to a wall outlet. When the AC adapter is receiving power, its power indicator will light.

Figure 8. Connecting the AC adapter.

POWER ADAPTER

CAUTION: *Use only the AC adapter supplied with the computer. Using the computer with any other adapter may damage the computer.*

For information on running your computer with power from the battery pack, see the section of this chapter titled "Using the Battery Pack."

The Power and Battery-Charge Icons

The AC adapter's icon comes on when the AC adapter is connected to a power. The battery pack icon (shaped like a battery) acts a a fuel gauge. When the battery pack is fully charged, the icon is solid. As the battery pack discharges, more and more of the icon will appear in outline form only.

Using the Battery Pack

Your computer comes with a rechargeable battery pack that lets you operate the computer without an external power source. When the battery pack is fully charged, you can operate the computer for approximately 2.0 hours under the following conditions:

- The battery pack initially has a full charge.

- No peripheral devices are installed.

- The disk drives run no more than 10% of the time.

Installing and Removing the Battery Pack

Before you can use the battery pack, you must install it in the compartment on the bottom of the computer.

➲ *To install and remove the battery pack:*

To install the battery pack, simply slide it into the empty battery compartment, which is located on the right side of the computer, next to the floppy drive. You can't put it in wrong, because it is designed so that it only fits one way. Make sure you slide it all the way in; the release lever will click into place when this is done.

To remove the battery pack:
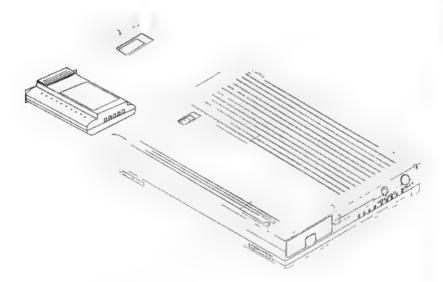
1. Turn off the computer.

2. Close the LCD screen and turn the computer over.

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3. Locate the battery pack release lever on the bottom of the computer (see Figure 9).

4. With your thumb, slide release lever away from the battery pack, and push the battery pack out a little.

5. Once the battery pack is moved a little way, you can let go of the release lever, and pull out the battery pack more easily.

The following figure shows removing the battery pack from its compartment.

Figure 9. Removing the battery pack.

Charging the Battery Pack

The installed battery pack charges automatically while the computer is connected to the AC adapter and an external

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power source. The battery pack can be fully charged in about 2.0 hours when the computer is turned off.

While the battery is charging, the AC adapter's Power/Charge indicator will be amber. The Power/Charge indicator turns green when the battery is fully charged.

Note: *It is a good idea to occasionally discharge the battery pack fully to preserve its operating performance. For details, see the section "Batteries & Battery Discharge" in Chapter 7.*

Switching from Battery Power to AC Power

You can plug the AC adapter into the computer without turning the power off. If you have been using battery power, the computer will automatically switch to AC power.

2.3   Turning on the Notebook Computer

Turn on your computer by pressing the power switch on the left side of the computer. The Power icon will light and the Power-On Self Test (POST) will run automatically (for a description of the Power-On Self Test, see Chapter 8, "Troubleshooting"). After the test runs successfully, you should hear a single short beep.

After the POST is completed, the computer reads the operating system from the hard disk drive into computer memory (this is commonly referred to as *booting* a computer) and the operating system prompt appears.

That's all there is to it. After you boot the computer, you may be prompted to enter the current date and time. Unless you wish to change the computer's internal clock settings, ignore these prompts by pressing the Enter key.

You are now ready to run software programs and use devices such as printers and disk drives.

About the System Setup

After you turn on the computer for the first time, you will need to run the System Setup (for a detailed description, see Chapter 4).

The System System is a ROM-based software utility that displays the system's configuration status and provides you with a tool to set system parameters. These parameters are stored in non-volatile battery-backed CMOS RAM which saves this information even when the power is turned off. Whenever the system is turned on, the system is configured with the values found in CMOS memory.

About the ROM BIOS

Your notebook computer is configured with a customized Basic Input/Output System (BIOS), which is a set of permanently recorded program routines that give the computer its fundamental operational characteristics. The BIOS also tests the computer and determines how the computer reacts to specific instructions that are part of programs.

The BIOS is made up of code and programs that control the major input/output devices in the computer. It also contains a set of routines (called POST, for Power-On Self Test) that check out the computer when you turn it on.

About the Power-On Self Test

The Power-On Self Test (POST) runs every time you turn on the computer. The POST checks memory, the main system board, the display, the keyboard, the disk drives, and other installed options.

A few seconds after you turn on your computer, a copyright message appears on your display screen. A memory test

message appears next; as the test continues, memory size increases until all installed memory is tested. Normally, the only test routine visible on the screen will be the memory test.

Two classifications of malfunctions can be detected during the POST:

- Error messages that indicate a failure with either the hardware, the software, or the *Basic Input/Output System* (BIOS). These *critical malfunctions* prevent the computer from operating at all or could cause incorrect results. An example of a critical error is microprocessor malfunction.

- Information messages that furnish important information on the power on and boot processes such as memory status. These *non-critical malfunctions* are those that cause incorrect results that may not be readily apparent. An example of a non critical error would be a memory chip failure.

In general, if the POST detects a system board failure (a critical error), the computer halts and generates a series of beeps. If failure is detected in an area other than the system board (such as the display, keyboard, or an adapter card) an error message is displayed on the screen and testing is stopped. It is important to remember that the POST does not test all areas of the computer, but only those that allow it to be operational enough to run any diagnostic program.

If your system does not successfully complete the POST, but displays a blank screen, emits a series of beeps, or displays an error code, consult your dealer.

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2.4 Connecting Peripheral Devices

To expand your computing capabilities, you can add a variety of external devices to your computer. You may, for example, want to add a mouse, modem, or printer.

An *interface* is a set of rules that the computer follows for transferring data over a data cable – including what voltages are used, what the signals on each wire stand for, and so on. The computer is equipped with several interface ports, including an enhanced Centronics (parallel) port and a serial port. These are provided as a means of connecting peripheral devices to the computer.

Connect peripheral devices to the computer's interface ports as described below.
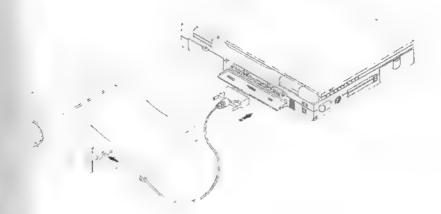
Parallel Printer

Your notebook computer is equipped with an enhanced bi directional Centronics parallel port. Use the parallel port to connect the computer to a printer or plotter.

The Centronics parallel port is the most widely used interface on personal computers because it usually does not require setup commands or special configurations on either the computer or the peripheral device.

After you connect a peripheral device to a parallel port, secure the two small screws on the connector.

Figure 10. Connecting a printer.

Serial Device

The rear panel of the notebook computer has a standard RS-232C serial interface port. Use the serial port to connect a peripheral device that can both input data to the computer and receive data from the computer. Serial ports are widely used on everything from mainframe computers to display terminals and modems.

The serial port on the rear panel is designated COMA. The COM port designation is a conventional way to tell your software which I/O (input/output) address to use in order to send and receive data. These I/O addresses are defined by IBM in their *Technical Reference* manuals, and are understood by all popular software manufacturers.

After you connect a peripheral device to the serial port, secure the two small screws on the connector.

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Note: *You cannot use the TouchPad and a serial mouse at the same time. In order to use a mouse, first disable the TouchPad. Then enable and configure the mouse as specified by the manufacturer.*
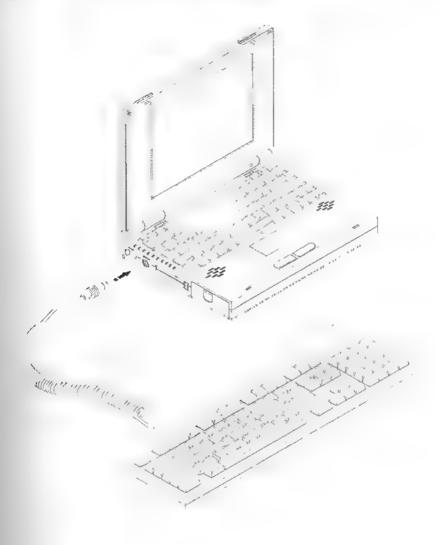
External Keyboard/Numeric Keypad

You can use your notebook computer with an optional external keyboard or numeric keypad.

➲ *To connect an external keyboard to your computer:*

1. Place the keyboard at the front of the computer or in another location appropriate for typing.

2. Plug the keyboard cable connector into the keyboard socket on the left side of the computer.

3. Adjust the legs on the underside of the keyboard for a comfortable typing angle.

Figure 11. Connecting an external keyboard.
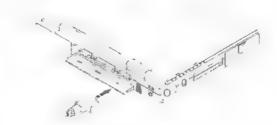
External Monitor

You can use an optional external VGA display monitor with your computer. Consult your dealer for information on your display monitor.

➲ *To connect an external VGA display monitor to the computer (you need a small screwdriver to connect the cable):*

1. Place the monitor in a convenient location near the notebook computer.

2. Plug the monitor's power cable into a wall outlet.

3. Plug the monitor's signal connector into the external VGA connector on the rear panel of the computer.

4. Secure the signal connector firmly to the video connector with the two small screws on the connector.

5. Before you turn on the monitor, turn on your computer and use the System Setup to designate the screen(s) that you want to use.

6. Turn on the monitor and adjust the monitor stand so that you have a good viewing angle of the screen.

Figure 12. Connecting an external display monitor.

3 Using the Notebook Computer

This chapter instructs you in using the special features of the notebook computer, including:

- The keyboard
- Hot Keys
- The TouchPad
- PC cards
- Power Saving modes

It also tells you how to remove or replace the hard disk drive, and it discusses using an optional docking station.

3.1 Getting to Know the Keyboard

In getting to know your keyboard, it helps to see the keyboard as divided into functional sections:

- The alphanumeric keys
- The cursor keys
- The function keys
- The internal numeric keypad
- The Fn key
- Special application keys

The Alphanumeric Keys

Most of the keys on the keyboard behave no differently than the keys of an ordinary typewriter (except that the keys on the computer keyboard repeat when you hold them down). As you would expect, these keys are used to enter alphanumeric characters. Use them to type characters, including numbers and symbols such as ~ and .

In addition, some keys on the keyboard are used in combination with alphanumeric keys to produce different characters. Other keys perform more specific actions, depending on how the operating system and your application program are designed to use them. To learn more about how special keys work within specific applications, see the manual that came with the application.

Table 2. Typewriter keys.

Key	Function
Backspace	Deletes characters as it moves the cursor to the left. Use it to correct typing mistakes.
Caps Lock	When this key is engaged, letter keys produce uppercase letters (number and symbol keys aren't affected).
Enter	This key can be used in two ways: • At the operating system level and in many application programs, it executes a command. • In text processing programs, use it like a typewriter carriage return key: this moves the cursor to the start of a new line. Refer to the user's manual for the program you are using.
Shift	When you hold this key down, character keys produce uppercase letters (or the upper left character on keys with multiple characters). This key also performs some special functions when pressed in combination with other keys.
Spacebar	Moves the cursor to the right, inserting a space character. To move the cursor without inserting or deleting any characters, use the arrow keys.
Tab	Moves the insertion point horizontally to the next stopping place (tab stop).

The Internal Numeric Keypad

The keyboard's internal numeric keypad consists of the 16 alphanumeric keys that have characters printed in blue. The function of this keypad depends on the status of the Pad Lock function (simultaneously press the Fn and Num Lock keys to toggle this function on/off), Num Lock mode, and the Fn key:

- When the Pad Lock function is on (the PAD icon will light) and Num Lock mode is off, the internal numeric keypad acts like the cursor keys on a standard numeric keypad.

- When the Pad Lock function and Num Lock mode are both on (the PAD and NUM icons will appear), the internal numeric keypad acts like numeric keys on a standard numeric keypad.

When the Pad Lock function is on and you want to type one or more character keys in the internal numeric keypad, press and hold the Fn key while typing a keypad key. When you release the Fn key, you can continue using the keypad keys with their cursor or numeric function.

The Cursor Keys

The four direction (arrow) keys control the movement of the cursor on the screen. They do not affect the displayed characters.

The Function Keys

The keys in the top row of the keyboard labeled F1 through F12 are called the *function keys*. To determine the function of these keys for an application, refer to the user's guide for that application.

You can also press function keys in conjunction with the Fn key to perform special operations (see the description in the section "Using Hot Keys" below).

The Fn Key

You can press the Fn key in conjunction with function keys to perform special operations (see the description in the section "Using Hot Keys" below). Simultaneously pressing the Fn key and the Num Lock key toggles the Pad Lock function on and off (see the description of this function in the section "The Internal Numeric Keypad" above).

Special Application Keys

The keyboard has a number of special keys whose use varies with the application software you are using (see your application program manual for details). For many applications, these keys have the following functions:

Table 3. Special application keys.

Key	Function
Alt	Works in conjunction with other keys to perform various commands or functions. Refer to the user's manual for the program you are using.
	To use an Alt key combination, hold down the Alt key and press the other key.

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Key	Function
Ctrl	Works in combination with other keys to provide shortcuts or to modify other actions. Different applications use the Ctrl key in different ways. • In many programs, the Ctrl-C combination performs a break or program interrupt. • In many programs, the Ctrl-S combination halts scrolling and lets you view the display. Press the spacebar to continue scrolling. To use a Ctrl key combination, hold down the Ctrl key and press the other key.
Esc	Press this key to cancel or escape from a command or function.
PrtSc SysRq	Pressing this key sends the information currently showing on the display to a connected printer. Pressing this key in conjunction with the Ctrl key sends all output to a connected printer. Press this key combination again to stop the function.
Scroll Lock	In some applications, information will move across the screen differently when this key is engaged.
Pause Break	Pressing this key temporarily halts a running program. To continue using the program again, press any key. Pressing the Pause key in conjunction with the Ctrl key breaks the program.

Key	Function
Ins	Places the keyboard into the *insert mode*. While in the insert mode, data entries are made at the current cursor position and all data to the right of the cursor position moves to the right. The keyboard stays in the insert mode until you press the Ins key again.
Del	Deletes the character to the right of the cursor. All remaining characters to the right of the deleted position move one space to the left.
Home	Moves the cursor to the first character position on the top line of the screen.
End	Moves the cursor to the last character position on the bottom line of the screen.
PgUp	If this key is operable in the application program you are using, it lets you scroll to the previous page.
PgDn	If this key is operable in the application program you are using, it lets you scroll to the next page.

3.2 Using Hot Keys

The computer offers hot key commands that provide easy access to system features.

Table 4. Hot keys.
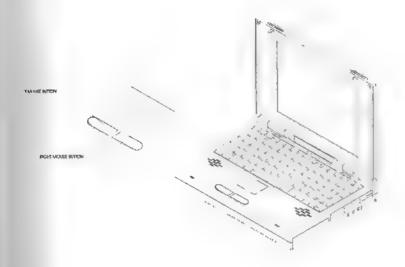
Hot Keys	Description
<F2>	Enter the System Setup menu (during POST).
<Fn+F1>	Reduce LCD brightness.
<Fn+F2>	Increase LCD brightness.
<Fn+F3>	Reduce LCD contrast.
<Fn+F4>	Increase LCD contrast.
<Fn+F5>	Toggle speaker high/low/off.
<Fn+F6>	Reduce the sound volume.
<Fn+F7>	Increase the sound volume.
<Fn+F8>	Suspend/Resume the system.
<Fn+F11>	Turn expansion video on/off.
<Fn+F12>	Switch the display between LCD/CRT/Simulscan.

3.3 Using the TouchPad

The built-in TouchPad is a convenient substitute for a mouse. Its function is similar to that of a two-button mouse: the left TouchPad button is equivalent to the left mouse button; the

right TouchPad button is equivalent to the right mouse button.

Figure 13. The TouchPad.

➲ *Use the TouchPad as follows:*

- To move the cursor, place your thumb or finger on the TouchPad's surface, and move it in the direction you wish the cursor to go.

- To click, press the TouchPad's left or right button. To double-click, press the button twice in quick succession.

- To drag, move the cursor to the desired location then press down the left button. While still holding down left button, move the cursor to the desired location. Then release the button.

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Installing a TouchPad Driver

The TouchPad is internally connected to the computer's PS/2 port. As with a mouse, the TouchPad must be enabled and configured in order to function correctly with your software.

- To use the TouchPad with Microsoft Windows, set up Windows to use the Microsoft, IBM PS/2 mouse driver, or the attached TouchPad driver.

- To use the TouchPad with a non-Windows application, run the TouchPad driver found on the Software Utilities disk (for a description, refer to Chapter 5).

3.4   Using PC Cards

The computer's PCMCIA sockets let you extend the capabilities of your computer by adding PC cards. There are a wide variety of PC cards available, including: expanded memory, data storage, fax/modem, Local Area Network (LAN), and wireless communication cards.

The PCMCIA (Personal Computer Memory Card International Association) interface specification has standardized the electrical, mechanical, and functional interfaces for PC cards. The computer has two PCMCIA-compatible sockets (each socket is a 68-pin connector), so you can use it with one card or two PC cards.

You can use the following types of PC cards with the computer: type I, type II, or type III. Type I, type II, and type III PC cards are 3.3mm, 5mm, and 10.5mm thick, respectively. The computer's PCMCIA sockets accept the following combinations of PC cards:

Card Type	Number of Cards
I	1 or 2*
II	1 or 2*
III	1

* You can also insert one type I and one type II card at the same time

Configuring a PC Card

Before you can use a PC card, it must be configured with a specific software driver. Refer to Chapter 5 for a list of provided software drivers.

Inserting and Removing PC Cards

This section describes inserting a PC card into a socket and removing a card. In addition, it discusses drive designations for ATA hard disk cards, Flash RAM memory cards, and SRAM memory cards.
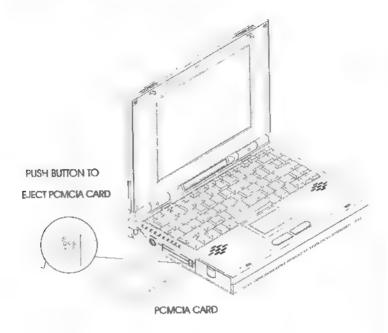
Note: *Before you can use your PC card drive, you must install the CardSoft software. For detailed instructions, refer to Chapter 6.*

The computer will emit a medium tone followed by a high tone when a PC card is inserted. When you eject a card, the computer will emit a high tone followed by a medium tone. You can insert and remove a PC card whether the computer is turned on or off.

The upper socket is PCMCIA socket "0"; the lower socket is socket "1". The upper ejection button is for socket "0"; the lower button is for socket "1".

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Figure 14. Inserting a PC Card.

PUSH BUTTON TO

EJECT PCMCIA CARD

PCMCIA CARD

➲ *Insert a PC card into a drive socket as follows:*

1. Put the socket end of the card (most cards have an arrow to indicate the socket end) into the drive socket.

2. Push the card firmly until it is fully inserted in the drive (the drive button will pop out).

    The system will beep twice to indicate that it has detected the PC card. In addition, the drive's icon will flash.

Remove a card from a socket by pushing the drive button and then grasping the card.

3.5   About Power Saving Modes

The computer offers two different levels of power savings control: system level management and device level power management.

- *System level* power management controls power to the entire system, including the internal clocks, CPU, and peripheral devices.

- *Device level* power management controls power to peripheral devices only.

Both system level and device level power management functionality can be controlled by adjusting the settings in the Power Menu in System Setup. You can either keep the default settings ("Maximum Performance" or "Maximum Savings") or set your own power management parameters ("Customize").

In addition to the normal operating mode, the computer provides the following power management modes: Idle, Standby, and Suspend.

These modes let you conserve power by temporarily shutting down certain computer subsystems. The table below summarizes power management functions for each mode.

Mode	CPU	DRAM	LCD	HDD	COM	LPT
Normal	high	on	on	on	on	on
Idle	low	on	on	on	on	on
Standby	low	on	off	off	on	on
Suspend	Static	on	off	off	off	off

Each of these modes is described in greater detail below.

Normal Mode

In normal mode, all system clocks are running at full speed and all peripheral devices have power.

Idle Mode

In Idle mode, the CPU clock and some other clocks are reduced in frequency.

If you set the Idle Mode time-out value with System Setup, the computer will automatically enter Idle mode after a specified period of time during which there is no system activity.

From Idle mode, the computer returns to normal mode when there is input to or output from the computer (including display, keyboard, TouchPad, mouse, serial port, parallel port, PCMCIA socket, or hard disk drive activity).

Standby Mode

In Standby mode, the CPU clock and some other clocks are reduced in frequency. The LCD consumes very little power and the hard disk drive is powered down.

If you set the Standby Mode time-out value with System Setupand there is no system activity while the computer is in Idle mode, the computer will automatically enter Standby mode after the specified length of time.

From Standby mode, the computer returns to normal mode when there is input to or output from the computer (including keyboard, TouchPad, mouse, serial port, parallel port, PCMCIA socket, or hard disk drive activity).

Suspend Mode

Suspend mode is similar to Standby mode, with the difference that while in Suspend mode the computer can only return to normal mode when you press the Suspend/Resume hot keys (you can also use the Resume on Modem Ring feature to return to normal mode; see the description below). In Suspend mode most system components are off, including: the CPU, LCD, hard disk drive, and floppy disk drive.

Enter Suspend mode by pressing the computer's Suspend/Resume hot keys. The computer beeps, the LCD screen shuts off, and the Suspend icon goes on.

From Suspend mode, the computer returns to normal operating mode when you press the Suspend/Resume hot keys again. If your computer is connected to an optional external fax modem and you have enabled the Resume on Modem Ring feature with System Setup, the computer also returns to normal operating mode when a call comes in on the telephone line.

If there is no system activity while the computer is in Sleep mode, the computer will automatically enter Suspend mode after a length of time that you specify with System Setup(the Auto Suspend timeout option).

Note: The ROM address remapping features supported by QEMM
       (Stealth parameter ST:F ST:M) or 386MAX (VGASWAP)
       conflict with the ROM usage of the Power Management
       BIOS in the Notebook and may cause fatal error. You
       should disable the ROM address remapping feature , if you
       want to use memory manager like QEMM or 386MAX.

3.6 Replacing the Hard Disk Drive

Your notebook computer comes with a removable hard disk
drive You can replace the hard disk with another if
necessary.

A hard disk drive is a collection of solid spinning platters that
are permanently sealed into a dirt-free storage unit. Like a
floppy disk, a hard disk drive stores information magnetically.
However, your computer can find data stored on a hard disk
more quickly than data kept on a floppy disk. A hard disk
can also hold more data.

Your hard disk gives you access to all of your files, speeds up
computer operation, and makes "disk full" errors a lot less
common. Because of the higher capacity and faster access
speed, you probably will want to keep the files of the
operating system, software applications, and data files on your
hard disk. You may then use floppy disks primarily for
storing backup copies of programs and files.

A hard disk is more reliable than a floppy disk, since it runs
in a sealed, dust-proof case. But like floppy disks, hard disks
can fail occasionally, and their data is no safer against
accidental change or erasure than data on floppy disks. When
you store application programs and data files on your hard
disk, make sure that you also have a backup copy. Check
your operating system manual for information on backing up
your hard disk.

Note: *Before you can use your hard disk drive, the drive must be partitioned and formatted. Your dealer may have done this for you already. If not, refer to the user's manual for your operating system.*
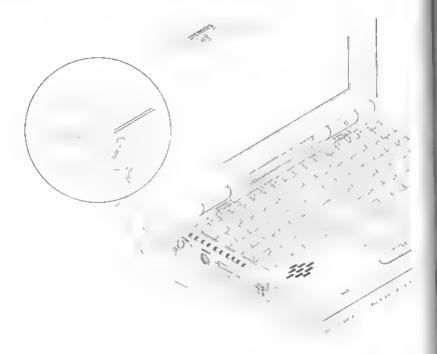
➔ **To replace a hard disk drive:**

1. Turn off the power to your notebook computer. (Make sure it is *completely off* before you remove the hard disk drive, and not just in suspend mode!)

2. With your thumbnail, push down the latch and open the hard disk compartment cover. It will only open partway (about 35 degrees) before it meets resistance.

3. Gently but firmly open the cover the rest of the way. As you do so, tabs on the inside of the cover will lever the hard disk out of its socket. Try to apply even pressure, to avoid damaging the cover.

4. When the cover is all the way open, the hard disk will already be pushed partway out of the compartment by the lever action of the compartment cover. You can now easily slide it the rest of the way out.

5. Slide the new hard disk drive into the compartment until it pushes against the tabs on the compartment cover, causing the cover to start to close.

6. With your finger, slide the new hard disk further into the compartment, until the conver comes to about a 45 degree angle.

7. Now simply push the cover closed, applying even pressure on its outside face. This will push the new hard disk drive into its socket. Installation is now complete!

8. If the new hard disk has a different number of heads, cylinders, tracks, and/or sectors per track than the old

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one, you may need to reconfigure your BIOS using System Setup. (See chapter 4 for details.)

Figure 16. Replacing the hard disk drive.

3.7   Connecting a Docking Station

The optional stationary docking station includes the following features:

- Expansion slots for

    - 2 ISA expansion cards;

    - 1 ISA and 1 PCI expansion card; or

    - 2 PCI expansion cards.

- External keyboard connector

- Serial ports (2)

- External floppy disk drive connector

- Printer port (Centronics)

- VGA connector

- AC Input

- Power switch

When the computer is connected to a docking station, the docking station controls power to the computer (the computer's DC IN connector will be covered).
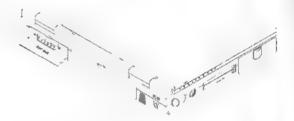
➲ *To connect your computer to a docking station:*

1. Place the computer so that you have access to its rear panel.

2. Plug the docking station into the 240-pin docking station connector on the computer's rear panel.

3. Plug the power cord into the AC Input connector on the docking station.

4. Connect the power cord to a wall outlet.

5. To run the computer, turn on the docking station's power switch.

Figure 19. Connecting a docking station.

4 Running System Setup
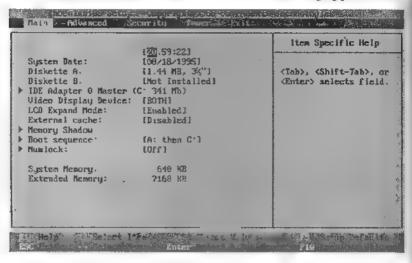
This chapter instructs you in using System Setup that is included in the computer's ROM BIOS.

4.1 Overview

System Setup is a ROM-based configuration utility that displays the system's configuration status and provides users with a tool to set their system parameters These parameters are stored in non-volatile battery-backed CMOS RAM which saves this information even when the power is turned off. When the system is turned back on, the system is configured with the values found in CMOS.

4.2 Accessing System Setup

To access System Setup, type <F2> during the Power-On
Self Test (POST). A screen similar to the following appears

System Setup displays the system's current configuration
settings. The top of the screen has a menu bar with various
items (i.e., Main, Advanced, Security, etc.).

4.3   The Menu Bar

The Menu Bar at the top of the window lists these selections:

Main	Use this menu for basic system configuration.
Advanced	Use this menu to set the Advanced Features available on your system's chipset.
Security	Use this menu to set User and Supervisor Passwords and the Backup and Virus-Check reminders.
Power	Use this menu to configure Power-Management features.
Exit	Exits the current menu.

Use the left/right "← →" arrow keys to make a selection.

See the section below, "Exiting Setup," for a description on exiting the Main Menu.

The Legend Bar

Use the keys listed in the legend bar on the bottom to make your selections or exit the current menu. The chart on the following page describes the legend keys and their alternates:

Key	Function
< F1 > or < Alt-H >	General Help window (See below).
< Esc >	Exit this menu.
← or → arrow keys	Select a different menu.
↑ or ↓ arrow keys	Move cursor up and down.
< Tab > or < Shift-Tab >	Cycle cursor up and down.

<Home> or <End>	Move cursor to top or bottom of window.
<PgUp> or <PgDn>	Move cursor to next or previous page
<F5> or <->	Select the Previous Value for the field.
<F6> or <+> or <Space>	Select the Next Value for the field.
<F9>	Load the Default Configuration values for this menu.
<F10>	Load the Previous Configuration values for this menu.
<Enter>	Execute Command or Select *P* Submenu.
<Alt-R>	Refresh screen.

To select an item, use the arrow keys to move the cursor to the field you want. Then use the plus-and minus value keys to select a value for that field. The Save Values commands in the Exit Menu save the values currently displayed in all the menus.

To display a sub menu, use the arrow keys to move the cursor to the sub menu you want. Then press <Enter>. A " *P*" pointer marks all sub menus.

The Field Help Window

The help window on the right side of each menu displays the help text for the currently selected field. It updates as you move the cursor to each field.

The General Help Window

Pressing <F1> or <Alt-H> on any menu brings up the
General Help window that describes the legend keys and their
alternates. The scroll bar on the right of any window indicates
that there is more than one page of information in the
window. Use <PgUp> and <PgDn> to display all the
pages. Pressing <Home> and <End> displays the first and
last page. Pressing <Enter> displays each page and then
exits the window.

Press <Esc> to exit the current window.

4.4   Main Menu Selections
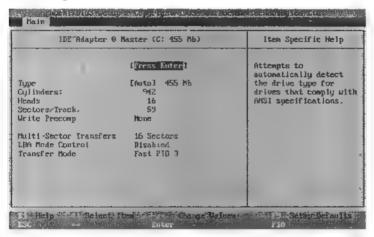
You can make the following selections on the Main Menu
itself. Use the sub menus for other selections.

Feature	Options	Description
System Time	HH:MM:SS	Set the system time.
System Date	MM/DD/YYYY	Set the system date.
Diskette A:	1.2MB, 5 1/4" 1.44MB, 3 1/2" Not installed	Select the type of floppy-disk drive installed in your system.
Diskette B:	1.2MB, 5 1/4" 1.44MB, 3 1/2" Not installed	Select the type of floppy-disk drive installed in your system via the Docking Station.
Video Display Device	Both LCD CRT	Select the video display device. This feature will be disabled when you install an ISA/PCI VGA card on the docking station.

LCD Expand Mode	Enabled Disabled	This feature will be disabled when you install an ISA/PCI VGA card on the docking station or when the current display device is set to CRT.
External Cache	Enabled Disabled.	Generally enables or disables all memory caching.
System Memory	N/A	Displays amount of conventional memory detected during bootup
Extended Memory	N/A	Displays the amount of extended memory detected during bootup

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IDE Adapters

The IDE adapters control the hard disk drives. Choosing IDE Adapter sub menus from the main menu displays the following screen:

```
┌─────────────────────────────────────────────────────────────────┐
│ Main                                                              │
├────────────────────────────────────────┬────────────────────────┤
│       IDE Adapter 0 Master (C: 455 Mb)  │ Item Specific Help     │
│                                         │                        │
│                     [Press Enter]       │ Attempts to            │
│                                         │ automatically detect   │
│  Type              [Auto] 455 Mb        │ the drive type for     │
│  Cylinders:              942            │ drives that comply with│
│  Heads                    16            │ ANSI specifications.   │
│  Sectors/Track.           59            │                        │
│  Write Precomp         None             │                        │
│                                         │                        │
│  Multi-Sector Transfers 16 Sectors      │                        │
│  LBA Mode Control      Disabled         │                        │
│  Transfer Mode         Fast PIO 3       │                        │
│                                         │                        │
├─────────────────────────────────────────┴───────────────────────┤
│ F1 Help    Select Item    Change Values    F9 Setup Defaults     │
│ ESC                         Enter           F10                   │
└──────────────────────────────────────────────────────────────────┘
```

Use the following chart to configure the hard disk drive with Advanced Hard Disk Features:

Feature	Options	Description
Autotype Fixed Disk	N/A	Pressing <Enter> at this field attempts to read the hard disk parameters from the drive itself and sets the following options to their optimum setting. "Sets Type field to "User" and allows editing of other fields.
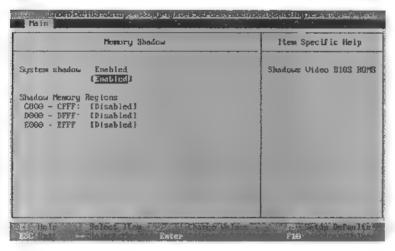
Type	1 to 39 User Auto	1 to 39 fills in all remaining fields with values for predefined disk type. "User" prompts user to fill in remaining fields. "Auto" autotypes at each boot, displays settings in Setup menu and does not allow editing of remaininf fields
Cylinders	1 to 16,384	Number of cylinders.
Heads	1 to 16	Number of read/write heads
Sectors/Track	1 to 63	Number of sectors per track.
Landing Zone*	N/A	Obsolete
Write Precomp*	N/A	Obsolete
Multi-Sector Transfers	Auto 2 sectors 4 sectors 8 sectors 16 sectors	Auto sets the number of sectors per block at the highest number supported by the drive. This is not always the fastest option.
LBA Mode Control	Enabled Disabled	Enables Logical Block Access. Default is Disabled
Transfer Mode	Standard	Selects the method for transferring the data between the hard disk and system memory. The Setup menu only lists those options supported by the drive and platform.

* IDE drives do not require setting Landing Zone and Write Precomp.

WARNING: Incorrect settings can cause your system to malfunction.

Memory Shadow

Selecting "System Shadow" or "Video Shadow" from the Main Menu displays a menu like the one shown here. The actual features displayed depend on the capabilities of your system's hardware.

```
 Main

              Memory Shadow                    Item Specific Help

 System shadow    Enabled                     Shadows Video BIOS ROMS
                 [Enabled]

 Shadow Memory Regions
   C800 - CFFF:  [Disabled]
   D000 - DFFF   [Disabled]
   E000 - EFFF   [Disabled]




      Help          Select Item         Change Value         Setup Defaults
 ESC                         Enter                     F10
```

Use the legend keys to make your selections and exit to the Main Menu. Use the following chart to configure memory shadowing.
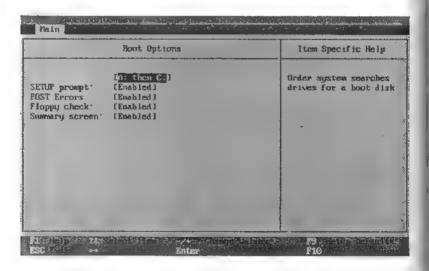
WARNING: Incorrect settings can cause your system to malfunction.

Feature	Options	Description
System shadow	N/A	Usually permanently enabled.
Video shadow	Enabled Disabled	Shadows video BIOS and improves performance.

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Shadow Option ROM	Enabled Disabled	Shadows option ROM located in the specified segments of memory and can improve performance. WARNING: Some option ROMs do not work properly when shadowed.

Boot Sequence

Selecting "Boot Sequence" on the Main Menu displays the Boot Options menu.
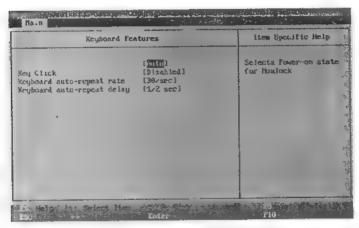
Use the legend keys to make your selections and exit to the Main Menu.

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Use the following chart to select your boot options.

Feature	Options	Description
Boot sequence	A: then C; C: then A: C: only	The BIOS attempts to load the operating system from the disk drives in the sequence selected here.
Setup prompt	Enabled Disabled	Displays "Press <F2> for Setup" during bootup.
POST errors	Enabled Disabled	At boot error, pauses and displays "Press <F1> to resume, <F2> to Setup".
Floppy seek	Enabled Disabled	Seeks diskette drives during bootup. Disabling speeds boot time.
Summary screen	Enabled Disabled	Displays system summary screen during bootup.

Numlock

Selecting "Numlock" on the Main Menu displays the
Keyboard Features menu:

Use the legend keys to make your selections and exit to the
Main Menu.
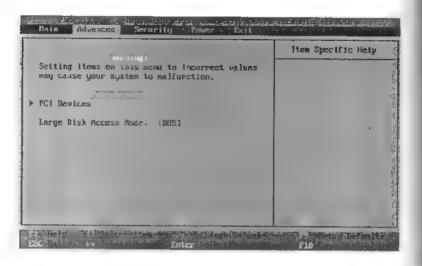
Use the following chart to configure the keyboard features:

Feature	Options	Description
Numlock	Auto On Off	On or Off turns NumLock on or off at bootup. Auto turns NumLock on if it finds a numeric key pad.
Key Click	Enabled Disabled	Turns audible key click on.

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Keyboard auto-repeat rate	2/sec 6/sec 10/sec 13.3/sec 21.8/sec 26.7/sec 30/sec	Sets the number of times a second to repeat a keystroke when you hold the key down.
Keyboard auto-lag delay	1/4 sec 1/2 sec 3/4 sec 1 sec	Sets the delay time after the key is held down before it begins to repeat the keystroke.

4.5   The Advanced Menu
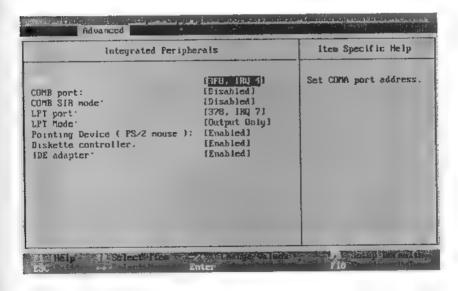
Selecting "Advanced" from menu bar on the Main Menu displays a menu like this:

```
 Main   Advanced   Security    Power    Exit

                                              Item Specific Help
              [Warning]
   Setting items on this menu to incorrect values
   may cause your system to malfunction.

 ▶ PCI Devices

   Large Disk Access Mode.  [DOS]



 ESC            ↑↓            Enter            F10
```

Use the legend keys to make your selections and exit to the Main Menu. Use the following to make your selection.

Integrated Peripherals Menu

Most chipsets manage the connections between the CPU and
the I/O ports (COM: and LPT:), the floppy disks, and the
hard-drive controllers. Some systems have a separate on-board
chip for handling these items. If your system has a separate
on-board I/O chip, selecting "Integrated Peripherals" menu
on the Advanced Menu displays a menu like this:

```
┌─────────────────────────────────────────────────────────────────┐
│    Advanced                                                       │
├───────────────────────────────────────────┬─────────────────────┤
│          Integrated Peripherals            │  Item Specific Help │
├───────────────────────────────────────────┼─────────────────────┤
│                          [3F8, IRQ 4]      │  Set COMA port address. │
│  COMB port:              [Disabled]        │                     │
│  COMB SIR mode·          [Disabled]        │                     │
│  LPT port·               [378, IRQ 7]      │                     │
│  LPT Mode·               [Output Only]     │                     │
│  Pointing Device ( PS/2 mouse ): [Enabled] │                     │
│  Diskette controller.    [Enabled]         │                     │
│  IDE adapter·            [Enabled]         │                     │
│                                            │                     │
├───────────────────────────────────────────┴─────────────────────┤
│   Help      Select Item                 Change Values            │
│   ESC                    Enter                      F10          │
└─────────────────────────────────────────────────────────────────┘
```

Use the legend keys to make your selections and exit to the
Main Menu.

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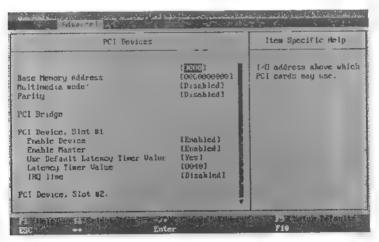
Use the following chart in configuring the chipset:

Feature	Options	Description
COMA port COMB port	Disabled 3F8, IRQ 4 2F8, IRQ 3 3E8, IRQ 4 2E8, IRQ 3 Auto	Select a unique address and interrupt request for the listed COM ports. Auto selects the next available combination.
COM B SIR mode	Enabled Disabled	Enable/Disable IR function in COMB Note: COMB *MUST* be set to 2F8, IRQ3 as COM2
LPT port	Disabled 3BC, IRQ 7 378, IRQ, 7 378, IRQ, 5 278, IRQ 5	Select a unique address and interrupt request for the LPT port. Auto selects the next available combination.
LPT mode	Output Only Bi-Directional ECP	Select a unique LPT Function. Output Only: Standard mode Bidirectional : PS/2 mode ECP: Extended Capabilities Port mode. EPP: Enhanced Parallel Port mode. (This mode will be enabled automatically when the EPP driver calls the BIOS EPP function.)
Pointing Device (PS/2 Mouse)	Enabled Disabled	Enable/Disable the pointing device.

Diskette Controller	Disabled Enabled	Enables the on-board floppy disk controller.
IDE Controller	Disabled Enabled	Enables the on-board IDE controller.

PCI Devices Menu

Selecting "PCI Devices" from the menu bar on the Advanced menu displays a menu like this:

PCI Devices are add-on devices equipped for operation with a PCI (Peripheral Component Interconnect) **bus**, the group of wires that connect the CPU with add-on devices. Use this menu to configure the PCI bus and the devices connected to it.

Note: PCI devices are effective when the system is docked.

Use the legend keys to make your selections and exit to the Advanced menu. Use the following chart in configuring the chipset:

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Feature	Options	Description
Base I/O Address	1000h to FF00h	Starting address of memory available to PCI devices for I/O
Base Memory Address	10000000h to FF000000h	Starting 32-bit address of memory available to PCI devices.
Multimedia mode	Disabled Enabled	Enables palette snooping for multimedia cards.
Parity	Disabled Enabled	Enables parity checking.
PCI Device, Slots #1 and #2		
Enable Device	Disabled Enabled	Enables selected device
Enable Master	Disabled Enabled	Enables selected device as a PCI bus master. Not every device can function as a master. Check your device documentation (Note: Slot #4 does not support the Master mode.)
Use Default Latency Timer	Yes No	If yes, do not program latency timer.
Latency Timer Value	0000h to 00F8h	Maximum number of PCI bus clocks that master may burst.
IRQ line	Disabled 10 15	Interrupt number selected for this device.

NOTE: Consult your dealer or the chipset manual before changing the items on this menu. **Incorrect settings can cause your system to malfunction.**

Large Disk Access Mode
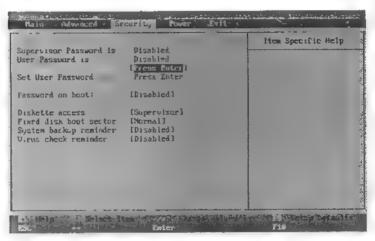
Selecting "Large Disk Access Mode" from the Advanced menu displays a screen like this:

```
  Main    Advanced    Security    Power    Exit

                                              Item Specific Help

   Setting items on this menu to incorrect values     If you have DOS, select
   may cause your system to malfunction.              'DOS'. If you have
                                                      UNIX, Novell Netware,
 ▶ Integrated Peripherals                             or other operating
 ▶ PCI Devices                                        systems, select
                                                      'Other'. If you are
                    [DOS]                              installing new software
                                                      and the drive fails,
                                                      change this selection
                                                      and try again
                                                      Different operating
                                                      systems require
                                                      different
                                                      representations of
                                                      drive geometries.


   F1  Help     ↑↓ Select Item     -/+  Change Values        F9  Setup Defaults
   Esc Exit     ←→ Select Menu     Enter                      F10
```

Feature	Options	Description
Large Disk Mode	DOS Other	Select DOS if you have DOS. Select Other if you have another operating system such as UNIX. A large disk is one that has more than 1024 cylinders, more than 16 heads, or more than 63 tracks per sector.

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4.6 The Security Menu

Selecting "Security" from the Main Menu displays a menu like this:

Use the legend keys to make your selections and exit to the Main Menu.

Enabling "Supervisor Password" requires a password for entering Setup. The passwords are not case sensitive.

Pressing <Enter> at either Set Supervisor Password or Set User Password displays a dialog box like this:

Type the password and press <Enter>. Repeat.
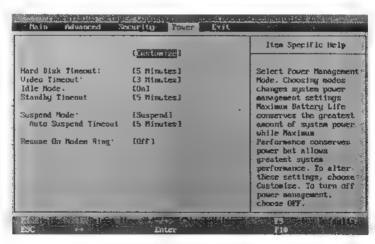
Use the following chart to configure the system-security and anti-virus options.

Feature	Options	Description
Supervisor Password	Up to seven alphanumeric characters	Pressing < Enter > displays dialog box for entering the supervisor password. This password gives full access to SETUP menus.
Set User Password	Up to seven alphanumeric characters	Pressing < Enter > displays the dialog box for entering the user password. This password gives restricted access to SETUP menus. Requires prior setting of Supervisor password.
Password on boot	Enabled Disabled.	Enabled requires a password on boot. Requires prior setting of the Supervisor password. If supervisor password is set and this option disabled, BIOS assumes user is booting.
Diskette Access	Supervisor User	Supervisor restricts use of floppy drives to supervisor. Requires setting the Supervisor password.
Fixed disk boot sector	Normal Write Protected.	Write protected helps prevent viruses.

System backup reminder Virus check reminder	Disabled Daily Weekly Monthly	Displays a message during bootup asking (Y/N) if you have backed up the system or scanned it for viruses.
		Message returns on each boot until you respond with "Y".
		Daily displays the message on the first boot of the day, Weekly on the first boot after Sunday, and Monthly on the first boot of the month.

4.7 The Power Menu

Selecting "Power" from the menu bar displays a menu like this:

Use this menu to specify your settings for Power Management. Remember that the options available depend

upon the hardware installed in your system. Those shown here are from a typical system.

A power-management system reduces the amount of energy used after specified periods of inactivity. The Setup menu pictured here supports a **Full On** state, a **Standby** state with partial power reduction, and a **Suspend** state with full power reduction.
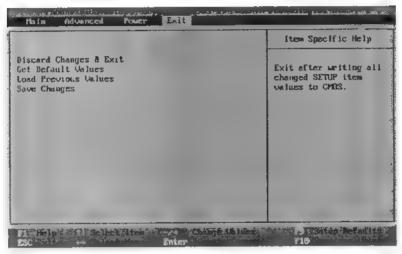
Use the legend keys to make your selections and exit to the Main Menu. Use the following chart in making your selections:

Feature	Options	Description
Power Saving	• Normal • Maximum Battery Life • Maximum Performance • Customize	"Normal, "Maximum Battery Life", and "Maximum Performance" set power-management options with pre-defined values. Select Customize to make your own selections from the following fields. Normal turns off all power management.
Hard Disk Timeout	Off 1 min 2 min ... 15 min	Inactivity period of fixed disk required before standby (motor off).
Video	Off 1 min 2 min ... 15 min	Turns video display off in Standby mode.

Idle Mode	On Off	Turns CPU idling on or off. Idle mode slows down the CPU during brief periods when the system is not busy.
Standby Timeout	Off 1 min 2 min ... 5 min	Inactivity period required to put system in Standby (partial power shutdown).
Suspend Mode	Suspend Save to Disk	Select the type of sespend mode.
Auto-Suspend Timeout	Off 1 min 2 min ... 15 min	Inactivity period required after Standby to Suspend (maximum power shutdown).
Resume On Modem Ring	Off On	When this feature is turned on, the system will *wake up* from suspend mode when an incoming call is detected by the modem. However, this feature will not work if Suspend Mode is set to *Save to Disk*.

4.8   The Exit Menu

Selecting "Exit" from the menu bar displays this menu:

The following sections describe each of the options on this menu. Note that < Esc > does not exit this menu. You must select one of the items from the menu or menu bar to exit.

Save Values and Exit

After making your selections on the Setup menus, always select either "Save values & Exit" or "Save Changes." Both procedures store the selections displayed in the menus in CMOS (short for "battery-backed CMOS RAM") a special section of memory that stays on after you turn your system off. The next time you boot your computer, the BIOS configures your system according to the Setup selections stored in CMOS.

After you save your selections, the program displays this message:

Changes have been saved

If you attempt to exit without saving, the program asks if you want to save before exiting.

During bootup, *Phoenix*BIOS attempts to load the values saved in CMOS. If those values cause the system boot to fail, reboot and press <F2> to enter Setup. In Setup, you can get the Default Values (as described below) or try to change the selections that caused the boot to fail.

Discard Changes & Exit

Use this option to exit Setup without storing in CMOS any new selections you may have made. The selections previously in effect remain in effect.

Get Default Values

To display the default values for all the Setup menus, select "Get Default Values" from the Main Menu. The program displays this message:

Default values have been loaded.

If, during bootup, the BIOS program detects a problem in the integrity of values stored in CMOS, it displays these messages:

System CMOS checksum bad - run SETUP
Press <F1> to resume, <F2> to Setup

The CMOS values have been corrupted or modified incorrectly, perhaps by an application program that changes data stored in CMOS.

Press <F1> to resume the boot or <F2> to run Setup with the ROM default values already loaded into the menus. You can make other changes before saving the values to CMOS.

Load Previous Values

If, during a Setup Session, you change your mind about changes you have made and have not yet saved the values to CMOS, you can restore the values you previously saved to CMOS.

Selecting Load Previous Values on the Exit menu updates all the selections and displays this message:

Previous values have been loaded.

Save Changes

Save Changes saves all the selections without exiting Setup. You can return to the other menus if you want to review and change your selections.

5 The Software Utilities Disks

This chapter describes the software utilities that are provided with your computer.

The instructions in this chapter assume that you understand elementary concepts of DOS. Before you attempt to install any driver or utility, you should:

- Know how to copy files from a floppy disk to a directory on a hard disk

- Understand the DOS directory structure

If you are uncertain about any of these concepts, refer to the DOS *Reference Guide* for more information.

Before continuing, make backup copies of the disks, and store the original disks in a safe place.

5.1 Pointing Device Driver

The driver for the TouchPad (or Trackball or Stick Pointer) is found on the Pointing Device Driver diskette.

Before running *Install*, please make sure you have at least 20 file handles in your CONFIG.SYS. Add this line to your CONFIG.SYS if not already present:

```
FILES=20
```

Then put the disk that has the driver into your floppy drive, and at the command prompt from your floppy drive, type:

`INSTALL`

followed by carriage return. Follow the instruction on the screen to complete the installation.

5.2 PMU

The computer supports Advanced Power Management (APM) version 1.1 which is a power-management standard provided by Microsoft and Intel. APM will prolong the battery operating life and monitor battery status. *APM drivers for DOS and Windows* is a standard package from Microsoft. If you cannot find this utility program, contact your DOS or Windows supplier.

Installation

For DOS users, install the PMU by adding the following line to your CONFIG.SYS file:

`DEVICE=C:\DOS\POWER.EXE`

➲ *For Windows users, change the Windows setup to APM system by doing the following:*

1. Execute "SETUP.EXE" in Windows directory.

2. Change the first option "System Setup" to "MS-DOS System with APM."

3. Insert diskette 2 to complete the Setup procedure.

5.3 VGA Display Drivers

This section describes the operation and installation of VGA display software drivers supplied on the *C&T 655XX diskette* that is shipped with your computer.

Software Drivers

Your computer's VGA circuitry is fully IBM VGA compatible and offers a large set of extended functions and higher resolutions. If you intend to use your computer's VGA circuitry in standard VGA modes only, you do not need to install any of these drivers.

The purpose of the provided software drivers is to take advantage of the extended features of the computer's VGA circuitry. These capabilities include:

- High-performance in Microsoft Windows

- Resolutions up to 1024x768 in graphics mode with 256 colors

- 640x480 resolution in graphics modes with 32K and 64K (CRT only)

- 132-column text mode

Before you begin the driver software installation, make sure you know the version of the application for which you are installing drivers. The *C&T 655XX diskette* contains drivers for several versions of certain applications. For your driver to operate properly, you must install the driver for your version of the application program.

Windows

These drivers are designed to work with Microsoft Windows version 3.1. You may install these drivers either through Windows or in DOS.

Driver Installation: Windows Setup

⊃ *To install the drivers in Windows:*

1. Install Windows as you normally would for a VGA display, and run Windows to make sure that it is working correctly.

2. Place the *C&T 655XX diskette* in drive A.

3. In the Windows Program Manager, choose Run from the File menu. At the Command Line Prompt, type the following and then press <Enter>:
   A:\WINSETUP

   The setup program locates the directory where Windows is installed. For proper installation, the drivers must be installed in the Windows subdirectory.

4. Press <Enter> to complete the installation. When completed, the Display Driver Control Panel appears on the screen. This Control Panel allows you to select and load the installed drivers.

Changing Display Drivers From Windows

⊃ *To change display drivers from Windows:*

1. Select the Windows Setup icon from the Main window. You will be shown the current setup configuration.

2. Select Change System Settings from the Option menu.

3. Click on the arrow at the end of the Display line. You will be shown a list of display drivers.

4. Click on the driver that you want, then click OK.

5. Follow the directions to complete the setup.

Changing Color Schemes

After you change display drivers, you may notice that the color scheme used by Windows looks strange. This is because different drivers have different default colors.

You can correct this by choosing the same color scheme or a new color scheme. First select the Control Panel from the Main window, then select the Color icon. You will be shown the current color scheme. Choose a new color scheme and click OK.

Driver Installation: DOS Setup

➲ *To install the drivers in DOS:*

1. Install Windows as you normally would for a VGA display, and run Windows to make sure that it is working correctly. Then exit from Windows.

2. Place the *C&T 655XX diskette* in drive A, and type *A:* to make this the default drive.

3. Run the driver SETUP program by typing *SETUP* and pressing <Enter>.

4. Press any key to get to the applications list.

5. Using the arrow keys, select Windows Version 3.1 and press <Enter>.

6. Press <Enter> to select All Resolutions, then press <End> to begin the installation. At this point you will be asked for the path to your Windows System directory (the default is C:\WINDOWS).

7. When the installation is complete, press any key to continue. Press <Esc> followed by Y to exit to DOS.

8. Change to the directory where you installed Windows (usually C:\WINDOWS).

9. Run the Windows Setup program by typing SETUP and pressing <Enter>. It will show the current Windows configuration.

10 Use the up arrow key to move to the Display line and press <Enter>. A list of display drivers will be shown.

11. Use the arrow keys to select one of the drivers starting with an asterisk ("*") and press <Enter>.

12. Follow the directions on the screen to complete the setup. In most cases, you may press <Enter> to accept the suggested option. When SETUP is done, it will return to DOS.

13. Type WIN and press <Enter> to start Windows with the new display driver.

Changing Display Drivers From DOS

To change display drivers from DOS, change to the Windows directory and run SETUP, repeating steps 9 through 13 from above. In addition to the special display drivers marked by an asterisk ("*"), you should be able to use the following standard drivers.

VGA:	640x480, 16 colors
Super VGA:	800x600, 16 colors

Panning Drivers

Special panning drivers are provided to allow high-resolution modes to be displayed on a flat panel or CRT. These drivers will show a section of a larger screen, and will automatically pan or scroll the screen horizontally and vertically when the mouse reaches the edge of the display.

AutoCAD R12

These drivers are designed to work with Autodesk AutoCAD R12. They conform to the Autodesk Device Interface (ADI) for Rendering drivers and Display drivers. These display list drivers accelerate redraw, pan, and zoom functions.

Driver Installation

➲ *To install the drivers:*

1. Place the *C&T 655XX diskette* in drive A, then type *A:* and press <Enter> to make this the default drive.

2. To run the SETUP program, type *SETUP* and press <Enter>.

3. Press any key to get the applications list.

4. Using the arrow keys, select AutoCAD R12 and press <Enter>. This will display a list of supported driver resolutions.

5. Using the arrow keys and the <Enter> key, select the resolutions that are appropriate for your monitor.

6. When all of the desired resolutions have been selected, press <End> to begin the installation. At this point you will be asked for a drive and directory to copy the driver files.

7. Enter the drive and directory that contains the installed AutoCAD R12. You may be asked to change display driver disks, and if the destination directory does not exist you will be asked for confirmation.

8. When the installation is complete, press any key to continue. Press <Esc> followed by Y to exit to DOS.

9. Go to the AutoCAD directory where the new drivers were
   installed and run the driver installation program by typing
   the following and then pressing <Enter>.
   ```
   ACAD12 -r
   ```

   This program will configure your AutoCAD R12 to use
   the new display drivers.

10. Select *TurboDLD Classic*.

Configuring the TurboDLD Driver

➲ **To configure the TurboDLD driver:**

1. Select *Configure Video Display*.

2. In *Display Device Configuration* choose *Select Graphics
   Board/Resolution*. Then choose *Select Display Graphics
   Board* (you must select either 655xx Flat Panel or 655xx
   Flat Panel linear).

3. After choosing a graphics board, go to *Select Display
   Resolution*.

4. After selecting *Display Resolution*, save the new
   configuration and return to the main menu.

Basic Configuration Menu

This menu allows you to modify:

• Number of AutoCAD Command Lines

• Font Size: *6x8, 8x8, 8x14, 8x16, 12x20, 12x24*

• Dual Screen: *Enable/Disable*

User Interface Configuration

• Double-Click Interval Time:

- BP Button

- BP Highlight: *Patt Line/Xor Rect/Both*

- BP Refresh: *Enable/Disable*

- BP Cache: *Enable/Disable*

Expert Configuration Menu

This menu allows you to modify:

- Display List: *Enable/Disable*

- Drawing Cache: *Enable/Disable*

- Use Acad 31 bit space?: *Yes/No*

- Internal Command Echo: *Enable/Disable*

- BP Zoom Mode *Freeze/Float*

- Regen Mode *Incremental/Fast*

If you have previously installed a driver different from the TurboDLD driver, after installing the TurboDLD Classic, when running the Render Command, AutoCAD R12 will take you into AVE_RENDER to reconfigure Render for your new driver.

Lotus 1-2-3/Lotus Symphony

These drivers are designed to work with Lotus 1-2-3 Version 2.0, 2.01, and 2.2, and with Lotus Symphony Version 1.0 and 1.1.

Driver Installation

➲ *To install the Lotus drivers:*

1. Place *C&T 655XX diskette* into drive A. Make A the default drive by typing *A:* and pressing < Enter > .

2. Run the Setup program by typing *SETUP* and pressing <Enter>.

3. Press any key to display a list of supported applications.

4. Use the arrow keys to select *Lotus/Symphony* and press <Enter>. A list of supported screen resolutions will be displayed.

5. Use the arrow keys to select the desired screen resolution and press <Enter>. (Make sure your monitor is able to display the resolution desired).

6. Press <End> to begin the driver installation process. A default drive and directory path will be displayed.

7. Use the Backspace key to erase this default and type in the *123* directory. At this point you may be prompted to insert one of the other driver disks. You may also be asked to create the target directory if it does not already exist.

8. After the files have been installed, press any key to return to the list of supported applications.

9. Press <Esc> followed by Y to exit to DOS.

10. Copy all the files that were just created on the temporary directory onto a formatted floppy disk.

11. Go to your 123 directory and start the installation program. Type the following commands, pressing <Enter> after each:

    C:

    INSTALL

The Lotus installation program will load and present the installation menu. From this menu, select *Advanced Options*. From the *Advanced Options* menu, select *Add New Drivers to Library*. From the *Add New Drivers* menu, select *Modify Current Driver Set*. From the *Modify Driver Set* menu, select *Text Display*. From the *Text Display* menu, select a driver.

12. After selecting the appropriate VGA display driver, select *Return to Menu* to exit this menu and return to the Main Lotus Installation menu.

13. At the Main Lotus Installation menu, select *Save Changes*.

    At this point the Installation menu will prompt you for the name of your new Lotus configuration file. The Lotus system will prompt you with the default value: 123.SET. You do not have to use this name, however. You many want to use a filename that indicates the resolution of the driver it contains. For example, if you installed the 132-column by 25-line driver, you could name this driver 132X25.SET. Or if you installed the 80 by 50 driver, you may want to call the file 80X50.SET.

    The installation of your Lotus 1-2-3 driver is now complete.

14. To exit the Lotus installation program, at the Main Lotus Installation menu, select Exit.

Note: *If you use a driver set name other than 123.SET, remember to place the filename of your driver set on the command line when you start Lotus 1-2-3. For example, if you named your driver set 132X25.SET, give the following command to start Lotus 1-2-3:*
```
123 132X25.SET
```

VESA

The Video Electronics Standards Assocation (VESA) has created a standard for a Super VGA BIOS Extension (VBE). This defines a standard software interface to allow application programs to set and control extended video modes, such as 800x600 graphics, on video adapters from different manufacturers.

The VESA driver adds this Super VGA BIOS Extension to the VGA BIOS. Any application program that supports the VESA standard driver interface can be used with this driver. This VESA driver conforms to the VESA Super VGA Standard #VS891001.

Driver Installation

➲ *To install the VESA driver:*

1. Place *C&T 655XX diskette* into drive A. Make A the default drive by typing *A:* and pressing <Enter>.

2. Run the Setup program by typing *SETUP* and pressing <Enter>.

3. Press any key to display a list of supported applications.

4. Use the arrow keys to select *VESA Driver Version 1.2* and press <Enter>.

5. Press the <Enter> key to select *All Resolutions*, then press <End> to begin the installation. A default drive and directory path will be displayed.

6. Use the Backspace key to erase this and type in a directory that is in the directory path (such as C:\BIN or C:\UTILS). At this point you may be prompted to insert one of the other driver disks.

7. After the files have been installed, press any key to return to the list of supported applications.

8. Press <Esc> followed by Y to exit to DOS.

9. To install the VESA driver, type either VESA or VESA + at the DOS prompt and press <Enter>. The optional + command line parameter enables all of the available modes. Make sure that your monitor is capable of displaying these high resolution modes before enabling them.

Word

These drivers are designed to work with Microsoft Word versions 5.0 and 5.5.

Driver Installation

If you have already installed Word on your computer, go to step 2 to install the new video driver.

➲ *To install the Word driver:*

1. Install Word as you normally would.

2. After you complete the Word installation, place *C&T 655XX diskette* into drive A. Make A the default drive by typing *A:* and pressing <Enter>.

3. Run the Setup program by typing *SETUP* and pressing <Enter>.

4. Press any key to display a list of supported applications.

5. Use the arrow keys to select *Word* and press <Enter>.

6. Use the arrow keys to select the desired screen resolution, then press <Enter>. Make sure your monitor is able to display the resolution desired.

7. Press <End> to begin the driver installation process. A default drive and directory path will be displayed.

8. Use the Backspace key to erase this and type in your Word directory. At this point you may be prompted to insert one of the other driver disks.

9. After the files have been installed, press any key to return to the list of supported applications.

10. Press <Esc> followed by Y to exit to DOS.

11. Copy the driver file for the desired resolution that was just installed to SCREEN.VID.

WordPerfect

These drivers are designed to work with WordPerfect version 5.0 or 5.1. They support 132-column display in editing mode, and high-resolution graphics display in PreView mode.

Driver Installation

➲ *To install the WordPerfect driver:*

1. Place *C&T 655XX diskette* into drive A. Make A the default drive by typing *A:* and pressing <Enter>.

2. Run the Setup program by typing *SETUP* and pressing <Enter>.

3. Press any key to display a list of supported applications.

4. Use the arrow keys to select *WordPerfect* and press <Enter>.

5. Use the arrow keys to select the desired screen resolution, then press <Enter>. Make sure your monitor is able to display the resolution desired.

6. Press <End> to begin the driver installation process. A default drive and directory path will be displayed.

7. Use the Backspace key to erase this and type in your WordPerfect directory. At this point you may be prompted to insert one of the other driver disks. You may also be asked to create the target directory if it does not already exist.

8. After the files have been installed, press any key to return to the list of supported applications.

9. Press <Esc> followed by Y to exit to DOS.

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10. Start WordPerfect and press <Shift> + <F1> to enter the setup menu. Select *D* for Display and *G* for Graphics Screen Type and then choose the desired Chips VGA resolution.

Configuring WordPerfect 5.0 for 132 Columns

Follow these instructions to configure WordPerfect 5.0 for 132-column text mode.

➲ *To configure WordPerfect 5.0 for 132-column text mode:*

1. Use the SETCOL program to set 132 columns and 25 rows. Give the following command and then press <Enter>:

   ```
   SETCOL 132, 25
   ```

2. Start WordPerfect. The program will automatically detect the number of rows and columns. If for some reason WordPerfect is unable to adapt to 132 columns by 25 rows, start WordPerfect with the following command:

   ```
   WP /SS=25,132
   ```

Configuring WordPerfect 5.1 for 132 Columns

Start WordPerfect and press <Shift> + <F1> to enter the setup menu. Select *D* for Display and *T* for Text Screen Type and then select Chips 132 Columns Text.

5.4   SETCOL Software Utility

This section describes the installation and operation of the SETCOL software utility supplied on the *C&T 655XX diskette*.

This utility program is used to provide 132 text columns in popular text-based applications such as WordStar and

WordPerfect. If you do not intend to use 132-column text mode, do not install this utility.

Installing the Utility

➲ **To install the SETCOL utility:**

1. Determine where you want to store the program. Locate a directory on your hard disk drive where you have other utility programs. For your convenience, this directory should be specified in the PATH= statement in your AUTOEXEC.BAT file.

2. Place *C&T 655XX diskette* into drive A. Make A the default drive by typing *A:* and pressing <Enter>.

3. Run the Setup program by typing *SETUP* and pressing <Enter>.

4. Press any key to display a list of supported applications.

5. Use the arrow keys to select *Utilities* and press <Enter>. A list of utilities will be displayed.

6. Use the arrow keys to select the utilities desired, then press <Enter>.

7. Press <End> to begin the utilities installation process. A default drive and directory path will be displayed.

8. Use the backspace key to erase this default and type in the proper directory. At this point you may be prompted to insert one of the other driver disks. You may also be asked to create the target directory if it does not already exist.

9. After the files have been installed, press any key to return to the list of supported applications.

10. Press <Esc> followed by Y to exit to DOS.

Using the Utility

The SETCOL utility allows you to specify the number of rows and columns on the screen. You indicate these values to the SETCOL program by placing them after the name SETCOL on the command line. The format for the command is:

```
SETCOL COLUMNS, ROWS
```

Valid values for COLUMNS and ROWS are:

Columns	Rows
80 or 132	25 or 50

To set 132 columns with 25 rows, give the following command:

```
SETCOL 132, 25
```

Note 1: To use this program with an application program such as WordStar or WordPerfect, the application may need to be configured for the specific screen size.

Note 2: Certain monitors cannot display 50-character rows on the screen, due to hardware limitations in these monitors. The following table specifies how many rows can be displayed on common monitors:
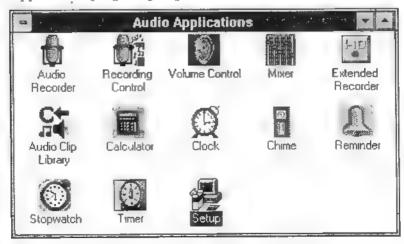
Monitor	Rows
IBM Monochrome	25
IBM Color Graphics Display	25
IBM Enhanced Graphics Display	25
IBM VGA Display (Analog)	25 or 50
Multi-frequency Display	25 or 50

5.5 Installing the ESS Sound Drivers

First-time installation:

1. Start Windows 3.1 or higher.

2. In Program Manager, choose **Run** from the File menu.

3. Place *Sound Driver & Utility Disk 1* in a floppy drive. In the Run dialog box, type the letter of the drive and **setup** (for example **A:\setup**), then click the OK button. The first *Audio* Drive Setup window appears.

After installation, the application icons appear in the Audio Applications program group:

Note: If you have a previous version of the software and the Setup program is unable to load the driver, follow this procedure:

1. Exit Windows and reboot your system.

2. Delete **auddrive.drv**, **vaudrv.386**, and **threed.vbx** from the directory
   windows\system, if any of these files are present.

3. Restart Windows, ignoring any Windows error messages

4. Insert Setup Disk 1 in a drive, then choose **Run** from the menu,
   enter **a:** and **setup**, and click the **OK** button.

5. Go through the Setup program again.

The Audio Recorder

The Audio Recorder enables you to record, compress, store and playback voice, music, and other sound. It provides settings for sound attributes such as mono/stereo, compression level, and sampling rate. You can use it to embed sound objects in documents created in applications that support object linking and embedding (OLE).
The Audio Recorder's record, edit and playback capabilities are compatable with the Windows Sound Recorder and other recorders that record and playback in the PCM format.

The Audio Recorder can record to and playback from both .WAV and .AUD formats. .WAV is the Microsoft Windows 3.1 audio file format. The .AUD format uses ESPCM/ADPCM compression to produce an audio file. The Audio Recorder provides a choice of linear PCM, ADPCM and low, medium and high ESPCM compression.

Starting the Audio Recorder

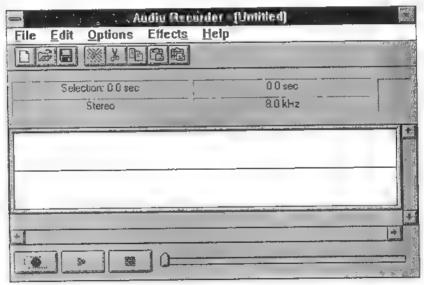To start the Audio Recorder, open the Audio Applications program group and double-click the Audio Recorder icon.

OR: choose **Run** from the Program Manager's File menu, then type `c:\pcaudio\audiorec` and click the OK button.

The Audio Recorder window appears:

The Audio Recorder can receive input from microphones, a cassette tape player, a compact disk player, or any other line-in source.

Areas under the button bar show the length of a selected part of the current audio file, the total time, mono or stereo, and the samplmg rate in kilohertz.

The large area in the center of the window shows the waveform of the current audio file.

The buttons at the bottom of the Audio Recorder window enable you to start and stop recording and playback.

RECORD	PLAY	STOP
Begins recording. recording/playback	Begins playback.	Ends

Recording Control

The Recording Control enables you to regulate the recording level and stereo balance at which sound is recorded from multiple sources. You use the Recording Control with the Audio Recorder or Extended Recorder during recording

Volume Control

The Volume Control enables you to regulate the volume and stereo balance (ES688 only) at which sound is played. You can use the Volume Control with the Audio Recorder during playback. If you are playing multiple sources, you can use the Mixer to combine them, with the Volume Control as a master regulator.

Mixer

The Mixer enables you to combine signals from several audio sources during playback, with control over the volume and stereo balance of each source.

When you use the Audio Recorder to play an audio file, you can open the Mixer to combine the audio from the file with audio from other sources.

The Volume Control is a natural companion to the Mixer. The Volume Control acts as a master regulator of the combined signal from the Mixer.

Extended Recorder

The Extended Recorder is designed as a tool for recording meetings, conversations, and dictation. Like the Audio Recorder, the Extended Recorder records, compresses, stores, and plays voice, music, and other sound. Unlike the Audio Recorder, the Extended Recorder compresses and stores the audio file directly to your hard disk, using on-chip ESPCM compression. The recording time is limited only by the amount of hard disk space you have available.

The Extended Recorder can record to and playback from both PCM and .AUD formats. PCM is the Microsoft Windows 3.1 audio file format. The .AUD format uses ESPCM compression to produce an audio file. The Extended Recorder provides a choice of linear PCM (8 or 16 bits) and ESPCM low (4 bits) compression.

Audio Clip Library

From the Audio Clip Library you can select and play audio files stored under three headings (or folders): music, phrases,

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and sounds. You can also add folders and audio files of your own to the Audio Clip Library.

You can play any audio file in the library by using the Audio Recorder (opened automatically by the Audio Clip Library), the Microsoft Sound Recorder, or other recorders compatible with the Windows .WAV format.

Audio Clip Library folders are stored in the directory PCAUDIO under the subdirectory AUDCLIPS.

Audio Reminder

The Audio Reminder has two alarms, each with a separate time, sound, and snooze settings. Once you set the alarms, they will go off on schedule every day as long as the Audio Reminder window is open or minimized to an icon.

Stopwatch

The Stopwatch keeps track of the time elapsed since it was started. You can set the Stopwatch to sound a tick each second it is running and announce the amount of time elapsed since it was activated.

Timer

The Timer works the opposite of the Stopwatch. The Timer counts down from the time you set to 00:00. Whenever you stop the Timer, it announces the amount of time remaining. The Timer sounds a bell each second it is running. From 19 seconds on down, the Timer announces each second.
You can also set the Timer to announce each minute as it passes.

6 CardSoft PCMCIA Software Suite

The PCMCIA solution provides a complete solution for expanding memory, mass storage, LAN, fax/modem, and wireless communications. The PCMCIA software solution in the system is called CardSoft which is licensed from SystemSoft.

The CardSoft software suite provides you with a complete "plug and play" system software solution for both DOS and Windows 3.1. This solution consists of the following drivers and utilities. Please be aware that your particular configuration may not include all drivers and utilities.

6.1 Getting Started

This section describes how to install the CardSoft and Flash File System software. It also discusses the beep sequences that are heard when you insert a PC Card into a slot, and describes how to configure your system's memory manager (if you are using one) to prevent a conflict with CardSoft.

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Installing the Software

The Installation Utility displays step-by-step instructions for installing the CardSoft software. Although the procedure is easy to follow, the instructions in this section provide additional details on considerations to be taken into account during the CardSoft installation process. If you received CardSoft with optional Flash File System support, the installation procedure is the same (with the exception that different driver files are installed in CONFIG.SYS).

Before You Begin

Note   If you do not use a memory manager (such as EMM386 or QEMM) on your computer, you can skip this section.

Before using the CardSoft software, you may have to inform your system's memory manager software to exclude a certain memory address range, because some PC cards require a particular address range for use as memory windows. During the installation procedure, if one of the following memory managers is detected, a warning screen similar to the one shown below is displayed, and the appropriate DEVICE line changes for your memory manager are also shown on the screen:

EMM386   QEMM   386MAX

```
The CardSoft 3.1 Install Utility has detected the presence of the
EMM386 memory manager.  In order for CardSoft 3.1 to function
properly, certain ranges of memory need to be excluded from this
memory manager.  If you wish to ensure proper functionality
of the CardSoft 3.1 drivers we suggest you add the switch
X=D000 DFFF.  After this installation is complete, please edit
the line in your CONFIG.SYS file to appear as below

     DEVICE=C:\DOS\EMM386 EXE NOEMS X=D000 DFFF

Press [Esc] to quit, any other key to continue
```

If you see this screen (or a similar screen), write down the displayed DEVICE line. When the installation has completed, change the memory manager device line in your CONFIG.SYS file to match the one displayed on this screen. To edit or display your CONFIG.SYS file, type the following command at the DOS prompt:

```
edit config.sys
```

If you are using the EMM386 memory manager, look for a line similar to the following (if you do not see a line like this, then you are not using EMM386 on your system):

```
device=emm386.exe
```

To exclude the address range D000-DFFF, change this line as shown here (this is what is displayed on the installation screen if EMM386 is detected):

```
device=emm386.exe noems x=d000-dfff
```

If you are using a memory manager other than those listed, refer to the manual that you received with the memory manager for instructions on how to exclude an address range.

HOW MUCH MEMORY SHOULD YOU EXCLUDE?

As a rule of thumb, you should exclude memory region D000-DFFF. Depending on the address space required for the PC card(s) you are using, you may be able to exclude a smaller address range; refer to the manual you received with your PC cards to determine if they require a particular address range to work properly.

WHAT'S NEXT?

After installation, if your system emits a single low tone beep when you insert a card, try increasing the address range being excluded, until you hear a medium tone followed by a higher tone beep when you insert the card. For example, if you originally excluded D000-D7FF, and the card is not working, try increasing the range to D000-DBFF. If the card is still not working, increase the range to D000-DFFF. If you are using a LAN card, check the documentation that came with it for the manufacturer's recommended configuration setting.

Note   Always restart your system when you change
*   CONFIG.SYS so that the changes can become effective.*

Installation Diskette
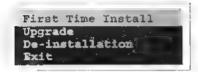
The installation diskette contains the install program files in the root directory (A:\), and the program files in the cardsoft directory (A:\cardsoft). If you received CardSoft with Flash File System support, the installation program automatically installs the Flash File System along with the CardSoft files.

CardSoft Installation

1. Insert the diskette containing the CardSoft software.

2. At the DOS command line, type a:, then press Enter.

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3. At the A:\ prompt, type install and press Enter. Then follow the on-screen instructions. If you need help with a particular screen, refer to the following sections for more information. On most screens, use the ↑ or ↓ arrow key to highlight your selection, then press Enter.

4. After the software is installed, reboot your system to activate the CardSoft drivers.

INITIAL SCREEN

```
First Time Install
Upgrade
De-installation
Exit
```

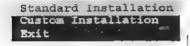First Time Install - Select this option if there are no previous versions of CardSoft installed on your system.

Upgrade - Select this option if there is a previous version of CardSoft on your system, and you want to upgrade to this release.

De-installation - Select this option if you want to remove CardSoft from your system.

Exit - Select this option to exit the Install utility without installing CardSoft.

INSTALLATION TYPE

```
Standard Installation
Custom Installation
Exit
```

Standard Installation - Select this option if you want to install all components, and you want the Install utility to automatically modify your CONFIG.SYS file.

Custom Installation - Select this option if you want to select the components that are installed, OR if you want to manually update your CONFIG.SYS file with the required DEVICEHIGH lines.

Exit - Select this option to exit the Install utility without installing CardSoft.

NUMBER OF PCMCIA SOCKETS

```
1
2
3
4
```

Select the EXACT number of PCMCIA slots on your system (for the notebook computer, select 2) If the number you select is too low, some of your PCMCIA slots will not work. If the number you select is too high, you will be wasting system resources.

DESTINATION DRIVE

```
Drive C:
Drive D:
Drive G:
Drive H:
```

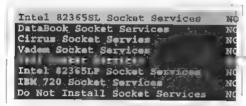Select the drive you want to install the CardSoft software on.

The drive letters that are displayed depend on your system's drive configuration, and whether or not you are connected to a network. In most cases, you may only see Drive C (or Drive C and Drive D).

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DESTINATION DIRECTORY

```
  Directory Pathname
\CARDSOFT
```

Specify the directory in which you want to install the CardSoft software. We recommend that you use the default, CARDSOFT To change the default, use the backspace key to delete CARDSOFT, then type in the desired directory name.

SOCKET SERVICES DRIVER

```
Intel 82365SL Socket Services      NO
DataBook Socket Services           NO
Cirrus Socket Services             NO
Vadem Socket Services              NO

Intel 82365LP Socket Services      NO
IBM 720 Socket Services            NO
Do Not Install Socket Services     NO
```

This screen appears only if the Install utility is unable to detect the type of PCMCIA controller in your system. Refer to your system manual to determine which Socket Services driver you should install.

Highlight the appropriate driver, use the Space Bar to toggle the NO to YES, then press Enter to install the driver and continue. Select "Do Not Install Socket Services Driver" only if a proprietary Socket Services driver is already installed, or if the driver your system requires is not provided with CardSoft.

CARDSOFT COMPONENTS DETECTED

This screen appears only if CardSoft components are already present in the specified destination directory. It indicates that CardSoft has already been installed on your system.

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```
          PLEASE NOTE THE FOLLOWING WARNING!

Some CardSoft 3.1 Install Utility has detected
pre-existing PCMCIA software installed on your computer
If this software is a version of CardSoft,
then choose De-install to remove these drivers from loading.

However, if this software is another type of PCMCIA software,
it is recommended to refer to your system's manual for
instructions on how to remove the drivers.

Note that if you do not de-install the current PCMCIA software before
installing the software on this diskette, you may encounter
configuration issues with the new software.

                  De-Installation
                  Exit
                  Continue Anyway
```

De-Installation - Select this option to remove existing CardSoft drivers from your system. Then run the Installation utility again to install the software.

Exit - Select this option to abort the Install utility and return to DOS. No CardSoft files will be installed. If you want to overwrite the existing version, run the Install utility again, and select Upgrade from the Initial screen.

Continue Anyway - Select this option to continue with the standard installation. Any existing CardSoft files on the system will be overwritten with the files on the installation diskette. If you have PCMCIA software other than CardSoft on the system, we recommend that you not choose this option. If you do, you may end up with an incompatible mix of PCMCIA drivers on your system, which could cause configuration problems with your PCMCIA cards.

COMPONENT SELECTION SCREEN

```
Intel 82365SL Socket Services              YES
Card Services                              YES
Card Services Allocation Utility           YES
Card Services Utility Initialization File  YES
ATA Card Driver                            YES
ATA Card Formatting Utility                YES
MTD Drive - required for any MTD support   YES
MTD - SRAM cards                           YES
Flash File System Formatting Utility       YES
CardID - Client Driver                     YES
CardID - PCMCIA Card Library               YES
CardID - Initialization File               YES
CS_APM - Power Management Driver           YES
```

This screen appears only during a Custom installation. It enables you to select the components you want to install. For example, if you don't use SRAM cards, you can elect not to install the driver for SRAM cards.

To cancel the installation of unneeded components, highlight the component, then press the Space Bar to toggle the YES to NO. The list that is displayed depends on the CardSoft optional packages you received (you may or may not have optional CardView Windows support files, and you may or may not have the optional Microsoft Flash File System). If there are more components than can be displayed on this screen, the remaining components can be displayed by using the ↓ key.

CONFIG.SYS UPDATE SCREEN

```
YES or NO?      YES
```

The prompt to update your CONFIG.SYS file appears only if you selected a Custom Installation. The standard installation will automatically modify your CONFIG.SYS. Select YES to

automatically update CONFIG.SYS with all the required
DEVICEHIGH lines for CardSoft, or select NO if you want
to manually update CONFIG.SYS. If you select NO, a
sample CONFIG.SYS file is created in the CARDSOFT
directory; you can use the sample to update your system
CONFIG.SYS file.

EXIT SCREEN

```
Exit to DOS
```

A screen similar to the above appears when the installation is
complete. Press Enter to exit the installation program and
return to the DOS prompt.

System Beeps

When you insert a card, your system emits a beep code to let
you know whether or not the CardSoft software was able to
recognize and configure the card. These beep codes are:

- Medium tone
  followed by high
  tone beep

  The PC card was recognized and
  successfully configured when inserted.

- Single low tone
  beep

  The PC card was recognized, but not
  successfully configured when inserted.
  When you hear a single low tone, it
  means the card will not work, and you
  may have to change your system
  configuration or CardSoft configuration
  to get the card to work.

Also, when you remove a card, you should hear a high tone
followed by a medium tone. This indicates that CardSoft is
aware that the card has been removed.

Using TDK CD02x Ethernet Cards

If you wish to use the TDK CD02x Ethernet card with CardSoft 3.1, it is necessary to make one small change to enable this card. In the subdirectory where CardSoft is installed, a file exists called CARDID.INI. Edit this file using any text editor and add the following line to the [Libraries] section:

```
CardLib=TDKLAN2.CLB
```

Save the CARDID.INI file and restart your system.

Using Xircom CE-10BT and CE-10B2 Ethernet LAN Cards

The CardSoft 3.1 package provides support for the Xircom CE-10BT and CE-10B2 Ethernet cards. In most cases, you should use the software drivers supplied by Xircom to enable this LAN card. In the event that you want CardSoft 3.1 to configure the Xircom cards, it is necessary to make one small change. In the subdirectory where CardSoft is installed, a file exists called CARDID.INI. Edit this file using any text editor and add the following line to the [Libraries] section:

```
CardLib=XIRCOM.CLB
```

Save the CARDID.INI file and restart your system.

Advanced Power Management

If your system is designed to conserve battery life through the use of Advanced Power Management drivers, it may be necessary to load the CardSoft CS_APM driver. Contact your system vendor to determine if your system supports Advanced Power Management.

To install CS_APM.EXE edit your CONFIG.SYS file and add the following line after the other CardSoft 3.1 files listed:

```
INSTALL-C:\CARDSOFT\CS_APM.EXE
```

Save the CONFIG.SYS file and reboot your system.

Removing CardSoft From Your System

Follow the instructions in this section if you want to remove the CardSoft software from your system.

```
First Time Install
D  :
Exit
```

➲ ***To de-install CardSoft:***

1. Insert the CardSoft installation diskette in drive A.

2. At the DOS command line, type a:, then press Enter.

3. At the A:\ prompt, type install and press Enter.

4. Press Enter from the copyright screen.

5. Select "De-installation", then follow the screen prompts.

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6.2 Using the CardSoft Utilities

This section describes how to use the CardSoft utilities and commands (CONFIG, CSALLOC, and CARDINFO) to help you configure and manage PC cards on your system.

Using CSALLOC

CSALLOC is a DOS program that scans the system for available memory (MEM), I/O Port (IOP), and Interrupt Request Line (IRQ) resources. It is also able to write this information to the file CSALLOC.INI, which is used by CardSoft to determine what system resources can be used by your PC cards.

For example, other hardware or software on your system may need to use certain system resources in order to work properly. If CardSoft were to use these resources, then the hardware (or software) might not work. CSALLOC makes sure that CardSoft does not use resources that are needed for something else.

In addition, CSALLOC:

- Scans upper memory for Read Only Memory (ROM)

- Scans for the Extended Memory driver

- Checks for the presence of HIGH memory

- Checks for the availability of Upper Memory Blocks (UMBs)

- Checks for the presence of the XMS driver.

- Enables you to display the current resource status of CardSoft.

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When to Run CSALLOC

CSALLOC runs automatically as part of the CardSoft installation and also when you start your system. During installation, a CSALLOC.INI file is created. As a result, you need to run CSALLOC from the CardSoft subdirectory (c:\cardsoft\csalloc) only when you need to display which system resources are being made available to CardSoft.

Also, if you have changed I/O Port, IRQ, or memory settings on your system (for example, if you change your COM Port settings in Windows, or you enable the XMS memory manager driver), you should run CSALLOC to scan the system for available resources and create an updated CSALLOC.INI. You should also run CSALLOC whenever you install new hardware or software that requires specific system resources, so that the resources required by the newly-installed item do not conflict with CardSoft.

How to Run CSALLOC

CSALLOC can only be run from the DOS command line. To run it, change to the CardSoft directory (cd cardsoft), then type one of the following commands (shown in bold type) and press Enter.

CSALLOC /S

You should use this command only if your system contains a Plug-and-Play (PnP) BIOS. When you enter this command, CSALLOC forces a scan of system resources, instead of relying on the PnP BIOS to inform CSALLOC as to how system resources are assigned.

CSALLOC /R

When you enter this command, CSALLOC displays the current status of memory (MEM), I/O Port address (IOP),

and IRQ resources on your system, as shown in the following example.

Resources marked with an ® are reserved for use by your PC cards or other system component (for example, 3F8-3FF is always reserved, since it is assigned to system COM Port 1). Resources marked with an (A) are already allocated for use by CardSoft. Resources marked with an (S) are shared resources (that is, they can be shared by several system components without creating a conflict).

Example:

```
MEM:
D000 DFFF
IOP:
108-16F, 170 177®, 178-1EF, 1F8-2E7, 2E8-
2EF®, 2F0-2F7, 2F8-2FF ®, 300-36F, 370-
377 ®, 380 3BF, 3E8-3EF®, 508-5EF ®, 5F8-
6F6 ®, 6F7 777®, 780-7BF®, 7E8-7EF®, 908-
9EF®, 9F8-AF6 ®, AF7 B77®, B80-BBF®, BE8
BEF®, D08 DEF®, DF8-EF6®, EF7 F77®, F80-
FBF®, FE8-FEF®
IRQ:
3, 5, 9, A, B, C®, D
```

CSALLOC /D

When you enter this command at the DOS prompt, you are prompted to remove any PC cards that are inserted in the system. Remove any PC cards, then press any key. CSALLOC then displays the contents of the file CSALLOC.INI, which contains information similar to the following (the information that is listed depends on your system configuration):

Example:

```
Scanning upper memory for Read Only
Memory (ROM)
ROM detected.
XMS driver detected.
High memory is present.
Allocated Upper Memory Block(s).
EMM driver is not present.
Scanning memory for RAM.
Scanning I/O Ports.
Scanning IRQs.
MEM=D000-DFFF
IO=108-1EF, 1F8-377, 380-3BF,3E8-3EF,
970-977, B70-B77, D70-D77, F70-F77
IRQ=3,A-B,D,F
#
# *** Resource modifications should be
made below this line. ***
#
RIO=170-177, 2E8-2EF, 2F8-2FF, 370-377,
3E8-3FF
MEMEXCLUDE=C000-CFFF, E000-EFFF
```

Note   *For a description of the resource lines (MEM=, IO=, etc.),*
see the later section of this chapter. You can cause
resources to be included, excluded, reserved, or shared,
either by modifying CSALLOC.INI, or by using the
Configuration Utility.

Using CARDINFO

CARDINFO is a DOS program that scans the PCMCIA slots
on your computer and lists information about the cards in

these slots. Also, if any of the slots contain cards when you start your computer, CARDINFO lists any warnings or error messages that may have occurred when CardSoft attempted to configure these cards.

When to Run CARDINFO

CARDINFO can be run at any time. Normally, you should run CARDINFO if:

- You need to know the types of cards that are currently inserted in your PCMCIA slots.

- You need to know the I/O Ports, IRQs, and Memory areas that are being used by your PC cards. This information may be needed if you are installing other components on your system, and you need to know if there is going to be a conflict between the new component and a PC card that you are currently using. ("Conflict" means that the new component and a PC card are trying to use the same resource, such as an IRQ interrupt; if this happens, either the PC card or the new component would have to be reconfigured to use other resources that are available.)

- You want to turn off (or turn on) power to a PCMCIA slot that contains a PC card.

- You want to display manufacturer and product information about your PC cards.

- You need to know the drive letter for your ATA Hard Disk or ATA Flash Disk card.

- You need to know the latest error that occurred for an inserted card.

How to Run CARDINFO

CARDINFO can be run in several modes from the CardSoft subdirectory DOS command line. To run it, change to your

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CardSoft directory (cd cardsoft), then type one of the following commands at the DOS prompt. CARDINFO can be run from within a Microsoft Windows DOS window; you do not have to exit Windows to run CARDINFO.

cardinfo | Runs CARDINFO in non-verbose mode. When you enter this command at the DOS prompt, information similar to the following is displayed:

Slot 0

    Card Type = Token Ring

    Manufacturer = <card vendor name>

    Product Name = Token Ring

Slot 1

    Slot 1 is empty

cardinfo /v | more | Runs CARDINFO in verbose mode, which displays more extensive information about the PCMCIA slots in your computer. (We recommend that you use the DOS "more" switch with this command, since the information may require more than one screen to be displayed). The following section contains an example of CARDINFO information using the /v switch. The type of information that is displayed depends on the type of cards that your PCMCIA slots contain.

cardinfo /c | Provides the following additional Card Services information.

- Card Services Release Number

- Vendor Revision Number

- Number of slots

- Vendor copyright information

This command gives you the ability to view manufacturer and product information for PC card client software other than the CardID component of CardSoft

cardinfo /off <.slot> Turns off power to all PCMCIA slots

cardinfo /on <:slot> Turns on power to all PCMCIA slots. For both of these commands, you have the option to specify a slot number. For example, cardinfo /off:1 turns off power to Slot 1 only. This enables you to turn off power to any slot not in use, without removing the card in that slot, thereby conserving system power.

cardinfo /? Displays information about CARDINFO switches.

SAMPLE CARDINFO INFORMATION

This section lists an example of the type of information that is displayed when you enter the cardinfo /v | more command. The exact information that is listed depends on the PC cards that are currently inserted in the system, and the number of PCMCIA slots in the system.

```
Client Information for handle 9B67:
Client Revision = 0.01
CS Support Level = 2.1
Revision Date = 02-07-1994
Client Name = "SRAM MTD"
Vendor Name - "SystemSoft Corporation"

Client Information for handle 9B3E:
Client Revision = 0.01
CS Support Level = 2.1
Revision Date = 03-14-1994
Client Name = "MTDDRV"
```

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```
Vendor Name - "SystemSoft Corporation"

Slot 0:
[Card Information]
Card Type = "ATA Disk" (Drive D:)
Manufacturer = <Vendor Name>
Product Name = <Vendor Product Name>

[Configuration Info]
Configuring client handle is 94D7
Memory + I/O Interface, Vcc 50, Vpp1 120,
Vpp2 120
Config base 0200, Config values:
Option value: 42
Copy value: 00
First I/O Range 170-177, 16-bit
Second I/O Range 378-37F, 16-bit
No IRQ is assigned to this card.
```

*Note   If you have CardSoft with optional Microsoft Flash File
System support, information on each of the card-specific
Memory Technology Drivers (MTDs) is also displayed.*

6.3   Using Removable Storage Cards

This section describes how to prepare and use removable
storage cards (that is, ATA Hard Disk/ATA Flash Disk cards
and SRAM cards). It also tells you how to determine which
drive letter(s) you should be using to access your removable
storage cards.

Using ATA Hard Disk and ATA Flash Disk Cards

In order to use ATA Hard Disk or ATA Flash Disk cards on your system, your CONFIG.SYS file must contain the following line (in addition to the standard drivers that are always required):

```
devicehigh-c:\cardsoft\atadrv.exe
```

Also, the ATA card has to be prepared before it can be used. To prepare the card, you have to run the ATAINIT command from the DOS prompt, then you have to use the standard DOS FORMAT command to format the ATA card. The following sections describe how to do this.

ATAINIT

ATAINIT.EXE is a disk partitioning utility that must be used to prepare any ATA card supported by ATADRV. When a new ATA card is inserted into a PCMCIA slot, it is not recognized since there is no common method to find out its physical parameters (number of sectors, cylinders, etc.). ATAINIT interrogates the card to find the physical parameters to use, then prepares it for use.

Note   ATAINIT works only with ATA cards that are supported by the ATADRV driver. If you are unable to use your ATA card, it may be an unsupported card. Check with the documentation that came with the card.

ATA Drive Cards and Drive Letters

Just as your system's hard disk has a drive letter (C:) assigned to it, so do ATA cards. However, the letter that is assigned to your ATA cards varies depending on your system configuration. Basically, ATADRV assigns the next available drive letter on your system.

In most cases, your first ATA card is assigned drive letter D:, and the second one is assigned E:. If, however, you have multiple drives already installed in your system, you may already be using drive letters D: and E: for these internal drives.

You can find out which drive letters have been reserved for your ATA Drive cards by using CARDINFO. To do so, insert the ATA card into a PCMCIA slot. Then, from the C:\cardsoft directory, type cardinfo and press Enter. A listing similar to the following is displayed:

```
Slot 1:
[Card Information]
Card Type = "ATA Disk" (Drive D:)
Manufacturer = <Vendor Name>
Product Name = <Vendor Product Name>
```

The drive letter is listed on the "Card Type" line.

Note   *You can configure the ATA driver as a "slave" to MTDDRV. If you do this, ATA cards share drive letters with Flash Memory and SRAM cards, and you can determine the correct drive letter to use by typing mtddrv /? at the DOS prompt from within the CARDSOFT directory. For more information, see the section of this chapter "DEVICEHIGH Lines Required for ATA Card Support".*

You can also find out which drive letter to use when you start your system. At system startup, a series of messages scrolls up the screen as different software and hardware drivers are automatically installed. One of these messages tells you which drive letter is the first drive letter that your ATA cards will be assigned.

You can press the PAUSE key to stop the messages from scrolling so that you can read them (to continue the system

startup, you then have to press the PRINT SCREEN key). As the system is starting, alternately press the PAUSE and PRINT SCREEN keys until you see the following message:

```
SystemSoft PCMCIA IDE disk driver Version
1.01
Copyright 1992-1994 SystemSoft
Corporation. All rights reserved.
This driver installed starting at Drive
D: for 2 unit(s).
```

The last line in this message tells you the first drive letter that will be used for your ATA cards, as well as the number of drives (units) that are installed. The sample message shown above indicates that there are two drive letters (D: and E:) reserved for ATA cards. The number of drive letters that is reserved is equal to the number of PCMCIA slots on the system.

Formatting an ATA Drive

Caution!   *Make sure you are using the correct drive letter when preparing your ATA card, as any information on the specified drive is erased. Refer to the previous section if you need to know which drive letter to use.*

➔ **To format a disk managed by ATADRV:**

1. From the DOS prompt (C:\), type cd cardsoft and press Enter.

2. Type
   ```
   ATAINIT <drive letter>
   ```

   and press <Enter>. Substitute the actual drive letter; if your ATA card has been assigned drive letter D:, you should type
   ```
   ATAINIT D:
   ```

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The following screen appears:

```
    Fixed Cylinders: 160                <F1> - Help
             Heads: 2                    <ESC> - Quit
Physical Sectors/Track: 32

Here are the parameters that were returned, examine them
carefully to ensure they match what was expected.
Hit ENTER to accept and continue or <P> to prompt.
```

*Note   You can press the ESC key at any time to abort
        ATAINIT processing.*

3. Press ENTER to accept the displayed values and continue.
   If, however, you are an experienced user, and you want to
   enter specific drive parameters, type P to display a screen
   that enables you to do so (then follow the screen prompts).

   The message "Do you wish a compact format?" is
   displayed.

4. In most cases, type N. If, however, your ATA card has a
   capacity of 4MB or less, type Y.

   ATAINIT now prepares the card. When the message
   `Partition table successfully written.`
   `BPB Boot sector successfully wiped.`
   `Proceed with a DOS "FORMAT /U" command.`

   appears, continue to Step 5.

5. Type
   `format <drive letter> /u`

   and press Enter, where <drive letter> is the drive letter
   assigned to the card. For example, if the card is Drive D,
   type
   `format D: /u`

Caution!   *It is very important that you use the correct drive letter in this command, because all data on the specified drive will be erased.*

The following message appears:
```
WARNING: ALL DATA ON NON-REMOVABLE DISK
DRIVE D: WILL BE LOST!
Proceed with format (Y/N)?
```

6. Type Y to continue. Wait for the drive to be formatted, then go to Step 7.

7. When the message
```
Volume label (11 characters, ENTER for
none)?
```

    appears, type in a volume label (this is simply your own name for the drive) and press Enter, or simply press Enter to leave the volume label blank (most people do not label their drives).

    The next message that appears shows you the drive capacity and other drive statistics. This means that your ATA card is now ready to be used.

Using SRAM Cards

In order to use SRAM cards on your system, your CONFIG.SYS file must contain the following lines (in addition to the standard drivers that are always required):
```
devicehigh=c:\cardsoft\mtsram.exe
devicehigh=c:\cardsoft\mtddrv.exe
```

SRAM Cards and Drive Letters

In order to use your SRAM card, you need to know which drive letter to use for access:

1. From the DOS command prompt, type cd cardsoft and press Enter to switch to the CardSoft directory.

2. Type mtddrv /? and press Enter. The following message is displayed:

   ```
   Drive E is partition number 00 for slot
   number 00.
   Drive F is partition number 00 for slot
   number 01.
   ```

   The drive letters you should use are listed at the end of the message that appears (as shown above). The number of drive letters listed depends on the number of PCMCIA slots in your system, and whether or not MTDDRV is configured for multiple partitions (the example above is for a system with two PCMCIA slots, configured for one partition per card).

   In this example, if you are inserting an SRAM card in your first PCMCIA slot (Slot 0), you would use drive letter E: to access the card; if you are inserting an SRAM card in your second PCMCIA slot (Slot 1), you would use drive letter F: to access the card.

Notes *Drive letters are shared by SRAM and Flash Memory cards. Using the example in Step 2, if you insert an SRAM card in Slot 0, it will be assigned Drive E; if you insert a Flash Memory card in Slot 1, it will use Drive F. If you remove the SRAM card from Slot 0, and insert a second Flash Memory card in Slot 0, it will be assigned Drive E, because that is the drive letter assigned to Slot 0 for SRAM and Flash Memory cards.*

ATA cards DO NOT share drive letters with SRAM and Flash Memory cards, unless you "slave" the ATA driver to MTDDRV.

Formatting SRAM Cards

Before you can use your SRAM cards, you have to format
them using the DOS FORMAT command. For example, if
the SRAM card is Drive F:, type

```
format F:
```

and press Enter. For more instructions on using FORMAT,
see your DOS User's Guide.

6.4   Customizing CONFIG.SYS

When CardSoft is installed, DEVICEHIGH lines are added to
your CONFIG.SYS file to install the various drivers needed
to support the different types of PC cards that are available.
However, depending on the types of PC cards you use, you
may not need to install all of these drivers in your system's
memory. You can prevent these unneeded drivers from being
installed by removing their devicehigh lines from
CONFIG.SYS, or by adding a "rem" statement to the
beginning of the devicehigh line.

Required DEVICEHIGH Lines

The following DEVICEHIGH lines must always be included
in CONFIG.SYS in order for CardSoft to function properly.
You should *never* delete or "rem" out these lines.

```
devicehigh-c:\cardsoft\<socket services
driver>*
devicehigh=c:\cardsoft\cs.exe
devicehigh=c:\cardsoft\csalloc.exe
<additional devicehigh lines needed to
support specific card types must be
inserted here>
devicehigh-c:\cardsoft\cardid.exe
```

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```
install=c:\cardsoft\cs_apm.exe
```

* The socket services driver that appears here depends on the PCMCIA controller your system uses.

This minimum configuration enables you to use modem, fax/modem, network, and other types of I/O or communications cards without installing any additional CardSoft drivers.

DEVICEHIGH Lines Required for ATA Card Support

In order to support ATA drive cards and ATA Flash Disk cards, your CONFIG.SYS file must contain the following additional lines:

```
devicehigh-c:\cardsoft\atadrv.exe
```

If you want to "slave" the ATA driver to MTDDRV, you need the following CONFIG.SYS lines. When you slave the ATA driver to MTDDRV, it allows you to share drive letters between SRAM, Flash Memory, and ATA cards. The value you use with the /S switch depends on the number of PCMCIA slots in your system. This example is for a system with one PCMCIA slot (/S:1).

```
devicehigh-c:\cardsoft\atadrv.exe /S:1
devicehigh=c:\cardsoft\mtddrv.exe
```

DEVICEHIGH Lines Required for SRAM Card Support

To support SRAM cards, your CONFIG.SYS file must contain the following additional lines:

```
devicehigh=c:\cardsoft\mtsram.exe
devicehigh=c:\cardsoft\mtddrv.exe
```

DEVICEHIGH Lines Required for Flash Memory Card Support

To support Flash Memory cards, your CONFIG.SYS file must contain the following additional lines:

```
devicehigh=c:\cardsoft\mtaa.exe
devicehigh=c:\cardsoft\mtab.exe
devicehigh=c:\cardsoft\mti1.exe
devicehigh=c:\cardsoft\mti2p.exe
devicehigh=c:\cardsoft\mtddrv.exe
devicehigh-c:\cardsoft\ssmsflsh.sys
```

Note   You will also need the optional MS FFS to get Flash cards to operate properly.

If You Have DOS 6.0 ...

If you have MS DOS 6.0 or greater installed on your system, you can set up your CONFIG.SYS file to display a menu that will enable you to choose the driver configuration you need during a session. For example, if you only need to load network card support, you can set up a section in your CONFIG.SYS file that loads only those CardSoft drivers that are needed to support network cards.

If you want to use an ATA card at a later time, you can have CONFIG.SYS load only those drivers that are needed to support ATA cards. By doing so, you can use your system's memory more efficiently, since you won't be loading unneeded drivers into memory when you start your system.

Following is a sample CONFIG.SYS file that displays a menu enabling you to load drivers to support all types of cards, or specific drivers to support a particular type of PC card. If you need more information on how to set up a menu in your CONFIG.SYS file, refer to your DOS manual.

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Note   *This example is for a system using CardSoft with optional Microsoft Flash File System support. Your CONFIG.SYS file may differ depending on your PCMCIA controller and whether or not you received CardSoft with optional Microsoft Flash File System support.*

Do not include the comment statements listed in the right column; they are provided only to assist you in understanding the various sections of this example.

Example

```
device=c \dos\setver exe              ; This group of lines defines a standard
device=c \dos\himem sys               , DOS startup. These lines contain the
files = 40                            ; commands that are normally run from
buffers = 40                          ; your CONFIG.SYS file. These lines
dos=high                              ; may differ based on your system's
shell=c \dos\command com /p /e 1024   ; configuration
stacks=9,256


[menu]                                ; This group of lines defines the menu
menuitem=normal, No CardSoft          , that will be displayed when you start
menuitem=cs_all, Complete CardSoft    ; your system.
menuitem=cs_io, Basic CardSoft installation
menuitem=cs_ata, CardSoft w/ATA Support
menuitem=cs_flash, CardSoft w/Flash Support
menuitem=cs_sram, CardSoft w/SRAM Support
menucolor=2, 7


[normal]                              ; No entries are needed in this section.
```

```
[cs_all]
devicehigh=c.\cardsoft\ < socket services driver >    ; This group of lines loads
devicehigh=c.\cardsoft\cs.exe         ; complete CardSoft support, enabling
devicehigh=c:\cardsoft\csalloc.exe  ; you  to use all types of PC cards,
devicehigh=c:\cardsoft\atadrv.exe   ; including Flash memory cards.
devicehigh=c:\cardsoft\mtaa.exe
devicehigh=c:\cardsoft\mtab.exe
devicehigh=c:\cardsoft\mti1.exe
devicehigh=c:\cardsoft\mti2p.exe
devicehigh=c:\cardsoft\mtsram.exe
devicehigh=c:\cardsoft\mtddrv.exe
devicehigh=c:\cardsoft\ssmsflsh.sys
devicehigh=c:\cardsoft\cardid.exe
install=c:\cardsoft\cs_apm.exe

[cs_io]
devicehigh=c.\cardsoft < socket services driver >     ; This group of lines loads
devicehigh=c:\cardsoft\cs exe         , CardSoft with I/O card support only
devicehigh=c.\cardsoft\csalloc.exe  ; (i.e , network, fax/modem, modem,
devicehigh=c:\cardsoft\cardid.exe   ; and other types of communication cards
install=c:\cardsoft\cs apm.exe

[cs_ata]
devicehigh=c:\cardsoft\ < socket services driver >    ; This group of lines loads
devicehigh=c:\cardsoft\cs.exe         ; CardSoft with ATA card and I/O
devicehigh=c:\cardsoft\csalloc.exe  ; card support only.
```

```
devicehigh=c:\cardsoft\atadrv.exe

devicehigh=c:\cardsoft\cardid.exe

install=c:\cardsoft\cs_apm.exe


[cs_sram]

devicehigh=c \cardsoft\ < socket services driver >    ; This group of lines loads

devicehigh=c:\cardsoft\cs.exe        ; CardSoft with SRAM card and I/O

devicehigh=c:\cardsoft\csalloc.exe c:\cardsoft\csalloc.ini   ; card support only

devicehigh=c.\cardsoft\mtsram.exe

devicehigh=c:\cardsoft\mtddrv.exe

devicehigh=c:\cardsoft\cardid.exe

install=c:\cardsoft\cs_apm.exe


[cs_flash]

devicehigh=c:\cardsoft\ < socket services driver >     ; This group of lines loads

devicehigh=c:\cardsoft\cs.exe        ; CardSoft with Flash Memory card

devicehigh=c:\cardsoft\csalloc.exe  ; and I/O card support only

devicehigh=c:\cardsoft\mtaa.exe

devicehigh=c:\cardsoft\mtab.exe

devicehigh=c:\cardsoft\mti1.exe

devicehigh=c:\cardsoft\mti2p.exe

devicehigh=c:\cardsoft\mtddrv.exe

devicehigh=c:\cardsoft\ssmsflsh.sys

devicehigh=c:\cardsoft\cardid.exe

install=c:\cardsoft\cs_apm.exe
```

7 Caring for Your Computer

This chapter provides you with information on how to keep your computer in top working condition.

7.1 Preventing Problems

Your notebook computer requires little physical maintenance. But as with any piece of electrical equipment, there are a few simple checks and precautions that will help assure that your computer provides outstanding performance for many years.

- Clean your computer occasionally.

- Unplug the computer from the wall outlet and remove the battery pack before cleaning. Use a damp cloth to clean your computer. Avoid using spray cleaners and any kind of alcohol or other inflammable solvents.

- Do not block the air flow around the computer. Maintain a distance of four inches (10 cm) between the computer and obstructions.

- Check the cable and power connectors periodically.

- Keep your computer away from excessive humidity, direct sunlight, high temperatures, and extreme cold.

- Do not smoke near your computer.

- Do not eat near or place liquids near your computer.

- Avoid dusty environments, as dust can cause damage to disks and disk drives.

- Never subject your computer to sudden shocks or extreme vibration. Do not drop it or hit it with other equipment.

- If you suddenly move your computer from a cold place to a warm place, undesirable moisture may condense inside the unit. After sudden temperature changes, let the computer come to room temperature before using it. This allows any moisture inside the computer to evaporate.

7.2   Traveling with Your Notebook Computer

For safety, security, and convenience when traveling with your computer, follow these guidelines:

- Before traveling, save your data by backing it up onto floppy disks.

- Take along an extra backup copy of your data.

- Do not travel with a disk in the floppy disk drive.

- Do not travel with the computer on. This may result in loss of data and/or damage to the hard disk drive.

CAUTION: *Do not transport the computer while it is turned on.*

- Before traveling, disconnect the AC adapter from the computer.

- Always carry either a spare, fully charged battery pack or the AC adapter.

- When carrying the computer, take care not to bump it into things. The computer cannot take the kind of treatment that you might give a briefcase.

- Whenever possible, hand-carry the computer in its carrying case.

If you must ship your computer as freight or baggage, pack it carefully. Use the original cartons and foam cushions, if possible. If they are not available, use sturdy cartons and cushion the computer well on all sides.

7.3 Batteries & Battery Discharge

It is a good idea to occasionally discharge the battery pack fully to preserve its operating performance. Repeatedly recharging the battery pack when it has not discharged completely can decrease the capacity of the battery pack.

In order to get the most out of the battery pack, we recommend that you attempt to use up the battery power completely before recharging. Then recharge the battery from empty to full.

You can also extend the life of the battery pack by using the computer's power-saving features.

➲ *To fully discharge and recharge the battery pack:*

1. Disconnect the AC adapter from the external power source, then from the computer.

2. Turn on the computer.

3. Ignore the power failure signals.

4. When the battery is fully discharged (that is, when the computer goes off), attach an external power source and fully recharge the battery.

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7.4   Taking Care of the LCD Screen

You can extend the life of the LCD screen by caring for the screen as follows:

- Avoid scratching the surface of the screen. The front polarizer is easily damaged.

- Use a soft, lint-free cloth for cleaning the LCD screen.

- Do not allow water droplets to remain on the screen. Water can cause permanent staining.

- Do not expose the LCD screen to bright sunlight or ultra-violet radiation.

- Do not expose the LCD screen to extreme temperatures. Freezing and liquification of the liquid crystals may result in damage to the display.

8 Troubleshooting

This chapter describes locating and solving problems that you may encounter while using your computer.

8.1 Locating a Problem

Problems with your computer can be caused by something as minor as an unplugged power cord – or as major as a damaged hard disk. The information in this chapter is designed to help you find and solve minor problems. If you try all the suggested solutions and you still have a problem, contact your dealer.

Successful troubleshooting is the result of careful observation, deductive reasoning, and an organized approach to solving the problem.

The problems that you will encounter can be divided into two basic categories: hardware problems and software problems. Hardware problems can be further divided into electrical and mechanical problems. You will know you have a hardware problem if the screen is dark, the computer cannot read the disk drives, or you get an error message during the Power-On Self Test.

Software errors can occur at several levels. The ROM BIOS and the operating system can give you a large number of error messages. And on top of this, each application software package has its own set of error messages. It is important to determine whether the software error message you are getting is from the application or the operating system. Once you know this, you can look in the respective manual for a solution to the problem.

8.2 Checking the Power, Cables, and Connections

Start by performing a careful visual inspection of the exterior of the computer. If no lights are displayed, make sure that your computer and its peripherals are getting power and communicating with each other properly.

➲ *To check the power, cables, and connections:*

1. If you have been using battery power, connect the computer to an external power source and make sure that the battery has a charge.

2. If you are using the computer with the AC adapter, check the power outlet, the power cord, and any power switches that may affect your computer:

   • Check the wall outlet or power strip with an item that you know is functioning properly. A lamp or radio is a convenient item for checking the power. You may also need to check the fuses and breakers in your electric box.

   • If the outlet is controlled by a wall switch, make sure that the switch is on.

   • If the outlet is controlled by a dimmer switch, use a different outlet.

   • If your computer is plugged into a power strip with an on/off switch, make sure the switch is on.

3. With the computer's power switched off, check all cable connections. If the computer is connected to any peripheral devices, look for loose or disconnected cables.

   If the computer is too close to a wall, a cable connection may be loose or the cables may be crimped.

Note: *Do not substitute cables for different type of devices even if they look exactly alike. The wiring inside the cable may be different.*

4. When you are certain that you have power available and all connections are good, turn the computer on again.

    If the computer still does not start, you may have a hardware problem.

8.3 About the Power-On Self Test

The Power-On Self Test (POST) runs every time you turn on or reset the computer. The POST checks memory, the main system board, the display, the keyboard, the disk drives, and other installed options.

A few seconds after you turn on your computer, a copyright message appears on your display screen. A memory test message appears next; as the test continues, memory size increases until all installed memory is tested. Normally, the only test routine visible on the screen will be the memory test.

Two classifications of malfunctions can be detected during the POST:

*   Error messages that indicate a failure with either the hardware, the software, or the *Basic Input/Output System* (BIOS). These *critical malfunctions* prevent the computer from operating at all or could cause incorrect and apparent results. An example of a critical error is microprocessor malfunction.

*   Information messages that furnish important information on the power-on and boot processes such as memory status. These *non-critical malfunctions* are those that cause incorrect results that may not be readily apparent. An

example of a non-critical error would be a memory chip failure.

In general, if the POST detects a system board failure (a critical error), the computer halts and generates a series of beeps. If failure is detected in an area other than the system board (such as the display, keyboard, or an adapter card) an error message is displayed on the screen and testing is stopped. It is important to remember that the POST does not test all areas of the computer, but only those that allow it to be operational enough to run any diagnostic program.

If your system does not successfully complete the POST, but displays a blank screen, emits a series of beeps, or displays an error code, consult your dealer.

8.4 General Hardware Problems

A few common hardware problems and suggested solutions are presented in the table below:

Table 5. General problems.

Problem	Solution
The display screen is dark.	• Make sure that the computer is not in Suspend mode. • Check the Brightness and Contrast controls for the screen. If the controls are turned too far down, the screen will be dark.
An incorrect date and time are displayed.	Correct the date and time using the DOS DATE and TIME commands or the options in the Setup Utility. If the date and time are still incorrect, contact your dealer to change the system board battery.
The message "Non-system disk or disk error, Replace and strike any key when ready" appears during boot.	You have inserted a non-bootable disk (either a defective disk or one without an operating system). Replace the disk with a bootable disk.
You hear irregular beep sounds and the computer halts operation.	Contact your dealer.

Problem	Solution
An unidentified message is displayed.	Reboot the computer, run System Setup, and confirm the setup parameters. If the same message is displayed after starting up again, contact your dealer.
You cannot operate the printer.	• Check the cable connection to the printer. • Check that the power switch of the printer is turned on. • Confirm that the printer is on-line.
You can't save anything to disk.	There are several conditions that might cause this problem: • The disk has not been formatted. See your operating system manual for information on formatting floppy disks. • The disk is write-protected. Eject the disk, remove the write-protection, and reinsert the disk. • The disk is full. You can try using another disk or you can remove items from the disk to free up more space. • The disk drive is not working. If you've tried the suggestions above and still have trouble saving anything, take the computer to your dealer for help.

Problem	Solution
You cannot operate the mouse.	• Check the cable connection. • Try using the mouse with another application to see if there is a compatibility problem between the software and the mouse.

8.5 Contacting Your Dealer

If you still have a problem after reading the preceding sections, the next step is to contact your dealer. He can determine if the problem is something that requires the computer to be taken to the shop. Before you call your dealer, however, prepare the following information:

• How is your computer configured? Your dealer needs to know what peripheral devices you are using.

• What messages, if any, are on the screen?

• What software were you running at the time?

• What have you done already to try to solve the problem? If you have overlooked a step, your dealer may be able to solve the problem over the phone.

Appendix A: Hard Disk Drive Types

The system BIOS supports 39 pre-defined drive types. Below is a table of the pre-defined drive types and their default values.

End users can modify the user-defined drive type for each fixed disk listed in Setup by using menus Setup menu system. This feature avoids the need for customized software for non-standard drives.

Type	Cylinders	Heads	Sectors	Wrt Pre	LZone
1	306	4	17	128	305
2	615	4	17	300	615
3	615	6	17	300	615
4	940	4	17	512	940
5	940	6	17	512	940
6	615	4	17	-1	615
7	462	8	17	256	511
8	733	5	17	-1	733
9	900	15	17	-1	901
10	820	3	17	-1	820
11	855	5	17	-1	855
12	855	7	17	-1	855
13	306	8	17	128	319
14	733	7	17	-1	733
15	Reserved	–	–	–	–
16	612	4	17	0	633

Hard Disk Drive Types

Type	Cylinders	Heads	Sectors	Wrt Pre	LZone
17	977	5	17	300	977
18	977	7	17	-1	977
19	1024	7	17	512	1023
20	733	5	17	300	732
21	733	7	17	300	732
22	733	5	17	300	733
23	306	4	17	0	336
24	612	4	17	305	663
25	612	2	17	300	612
26	614	4	17	-1	614
27	820	6	17	-1	820
28	977	5	17	-1	977
29	1218	15	36	-1	1218
30	1224	15	17	1	1224
31	823	10	17	512	823
32	809	6	17	128	809
33	830	7	17	-1	830
34	830	10	17	-1	830
35	1024	5	17	-1	1024
36	1024	8	17.	-1	1024
37	615	8	17	128	615
38	1024	8	17	-1	1024
39	925	9	17	-1	925

Appendix B: Using **PHDISK.EXE**

PHDISK.EXE is the utility program you use to prepare your hard disk for the Suspend to Disk function. It can be used to prepare either a dedicated partition or a DOS based hidden file prior to storing system configuration data, and system and video memory. You will find this program on the "C&T 655xx driver" diskette.

Command Line Options

The following table list the PHDISK command line options and additional parameters. The PHDISK options can be called using only the first letter of each option and parameter. For instance, either PHDISK /REFORMAT or PHDISK /R will invoke the reformat option.

Option	Parameters	Description
none		Displays the PHDISK Opening Screen.
/CREATE	/PARTITION	Format the Save to Disk partition.
	/FILE	Add space to the Save to Disk partition.
/DELETE	/PARTITION	Delete all Save to Disk partitions.
	/FILE	Delete the space added to the Save to Disk partition added by /CREATE /FILE.

/INFO		Displays data about the Save to Disk partition or file.
/REFORMAT	/PARTITION	Reformats the Save to Disk partition after an error is detected.

Below is an example of the kind of information that is displayed when PHDISK is called without a command line option. This example displays both the Save to Disk FILE INFORMATION and Save to Disk PARTITION INFORMATION headers. These headers are displayed only when both a Save to Disk partition and a Save to Disk file exist.

The USAGE and OPTIONS headers are displayed in several screens displayed by PHDISK.

```
PHDISK 2 2 -- Phoenix NoteBIOS 4 0 (TM) Save to Disk Preparation Utility
Copyright (c) Pnoenix Technologies Ltd  1995  All rights Reserved

Save to Disk file information.
    Partition starts at sector xxxxxx (head xx, cylinder xx, sector xx)
    Partition size: xxxx KBytes total

Current System Status
    You currently need a Save to Disk area of xxxx KBytes.  PhDisk will
    also require additional overhead and will automatically calculate the
    actual required space

You have both a file and a partition. Save to Disk will default
to file  Either delete the file, or the partition

Usage PHDISK [options]
/CREATE   (/FILE or /PARTITION)       -- Create STD file or partition
/DELETE   ./FILE or /PARTITION)          Delete existing STD file or partition
/INFO                                 -- Information on STD disk area(s)
/REFORMAT /PARTITION                  -- Reformat existing STD partition

This utility configures a hard disk to utilize the Phoenix NoteBIOS 4 0
Save to Disk feature  Please refer to your user manual for information
regarding Save to Disk
```

CREATE Option

The CREATE option measures the amount of on board memory, and partitions a segment of the hard disk drive large enough to store all the data that might be there. The CREATE option formats the Save to Disk partition, marking bad spots on the hard disk drive as they are found.

Automatic Memory Size Calculation

PHDISK automatically measures all system and video memory and calculates the exact amount of hard disk space required to store the maximum amount of data the memory might contain. The result of this measurement, [SIZE], is displayed on the PHDISK screen.

The total amount of system and video memory is calculated by one of the following formulas:

1. If the video BIOS is VESA compatible:

   calculated memory = physical system memory + 0.3 kbytes (Save to Disk overhead)

2. If the system does NOT contain a VESA video controller:

   calculated memory = physical system memory +

   2 Mbytes (maximum video memory required) + 0.3 kbytes (Save to Disk overhead)

User-Specified Memory Size

The user may specify a certain amount of memory to be allocated for the Save to Disk function. However, the amount of space required to store all system and video memory is calculated automatically, whenever the CREATE option is used, even if the user specifies some desired amount.

If the amount specified by the user is equal to or greater than the calculated amount, then the user-specified amount is

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allocated. If the user-specified amount is less than the calculated amount, then no space is allocated, and an error message is displayed.

If you wish to allocate a specific amount of disk space for this function, enter the amount in kilobytes, as a simple decimal number, *without* any notation such as *K* or *KB*.

/PARTITION or /P

PARTITION creates a hard disk partition where only Save to Disk data can be stored.

/FILE or /F

FILE creates a file on the hard disk DOS partition that is used to store only Save to Disk data.

When the system and video memory outgrows the size of this Save to Disk space, the /FILE option can be used to re-allocate a new Save to Disk partition, and also eliminates the time consuming task of backing up the entire hard disk drive before running PHDISK /CREATE /PARTITION. The Save to Disk file can be a temporary or a permanent solution.

After the Save to Disk file is created, use PHDISK /DELETE /PARTITION to keep Save to Disk from writing data there, instead of writing to the file. Save to Disk may not differentiate between the Save to Disk partition and the Save to Disk file until the partition is deleted.

/CREATE Option Syntax

The syntax of the PHDISK /CREATE option is:

```
PHDISK /CREATE [SIZE] [/FILE] [/PARTITION]
```

The table below shows the various ways to use the /CREATE option:

Command	Description
PHDISK /CREATE /FILE PHDISK /C /F	Supplements an existing Save to Disk file-space (adds the amount of additional memory required as calculated by PHDISK).
PHDISK /CREATE /PARTITION PHDISK /C /P	Creates a Save to Disk partition using the amount of memory required as calculated automatically by PHDISK.
PHDISK /CREATE /FILE 10240 PHDISK /C /F 10240	Creates a 10 megabyte Save to Disk file.

REFORMAT Option

The /REFORMAT option resets the pointers in a Save to Disk partition. This option should be used after a Save to Disk operation is terminated by a read or write error.

Note: Only Save to Disk partitions can be reformatted; Save to Disk files can not. If a formatting error occurs while writing to a Save to Disk file, use the PHDISK /CREATE /FILE /DELETE options to reformat the Save to Disk file.

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REFORMAT Option Syntax

Command	Description
PHDISK /REFORMAT /PARTITION PHDISK /R /P	Reformats the Save to Disk partition.

DELETE Option

When DELETE is specified, the pointers and data in the specified Save to Disk space are deleted. Use DELETE when bad data are displayed after a Resume from Disk operation.

Note: DELETE erases the <u>data</u> in the Save to Disk space. To actually <u>remove</u> the Save to Disk space, use the DOS FORMAT command.

DELETE Option Syntax

Command	Description
PHDISK /DELETE /FILE PHDISK /D /F	Deletes the contents of the Save to Disk file.
PHDISK /DELETE /PARTITION PHDISK /D /P	Deletes the contents of the Save to Disk partition.

INFO Option

The /INFO option displays data about the Save to Disk partition.

INFO Option Syntax

Command	Description
PHDISK /INFO /FILE PHDISK /I /F	Displays the size (in kilobytes) of the Save to Disk file.
PHDISK /INFO /PARTITION PHDISK /I /P	Displays the size (in kilobytes) and location of the Save to Disk partition.

Below is an example of the output of the /INFO option when a Save to Disk partition exists on the system:

```
PHDISK 2 2    Phoenix NoteBIOS 4 0 (TM) Save to Disk Preparation Utility
Copyright (c) Phoenix Technologies Ltd. 1995  All rights Reserved

Save to Disk file information:
   Partition starts at sector xxxxxx (head xx, cylinder xx, sector xx)
   Partition size: xxxx KBytes total

Current System Status
   You currently need a Save to Disk area of xxxx KBytes   PhDisk will
   also require additional overhead and will automatically calculate the
   actual required space.
```

Messages

PHDISK returns various informational messages, not all of which are listed here. The following list emphasizes the error messages, including a possible course of action should one of them appear.

PHDISK Sign-on Message

```
PHDISK 2.2 -- Phoenix NoteBIOS 4.0 (TM) Save to Disk Preparation Utility
Copyright (c) Phoenix Technologies Ltd  1995  All rights Reserved.
```

Help Screen

The HELP screen is displayed when PHDISK is called without any command-line options. The following text is displayed when a Save to Disk space already exists:

```
Usage PHDISK [options]
/CREATE   (/FILE or /PARTITION)     -- Create STD file or partition
/DELETE   (/FILE or /PARTITION)     -- Delete existing STD file or partition
/INFO                               -- Information on STD disk area(s)
/REFORMAT /PARTITION                -- Reformat existing STD partition

This utility configures a hard disk to utilize the Phoenix NoteBIOS 4 0
Save to Disk feature  Please refer to your user manual for information
regarding Save to Disk.
```

Unrecognized Option

The following text is displayed when an invalid option or parameter is entered on the command line:

```
Error: (User option) is an unrecognized command line option
For a command line summare, invoke PHDISK without any parameters
```

Fatal Error

The following text is displayed when a hard disk error is detected during any Save to Disk operation. (Don't panic! The word *fatal* simply means that the program was terminated, not that your hard disk is trashed.)

```
Error: A fatal hard disk error has occurred.
Check your hardware configuration and re execute PHDISK
```

Run a hard disk utility program to determine the source of the error, then run PHDISK again.

Not Enough Disk Space

The following text is displayed when the amount of unused disk space available is less than the amount required to create the Save to Disk partition.

```
Error: Not enough free disk space exists to create
the suspend to disk partition. Refer to the user
manual for possible suggestions on increasing the
```

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among of free disk space for the suspend to disk
partition.

Delete unused files, backup the DOS partition, reformat the
disk, then run PHDISK /PARTITION /CREATE to create a
larger partition.

Save to Disk Partition Exists

The following text is displayed when a PHDISK /CREATE
/PARTITION operation is attempted while a Save to Disk
partition exists.

Error:Phoenix NoteBIOS Save to Disk partition
already exists. To resize the partition, delete
the existing partition with PHDISK/DELETE and
create the partition with PHDISK/CREATE.

Re-allocate the Save to Disk partition, if needed; or do
nothing.

Too Many Bad Sectors

The following text is displayed when the Save to Disk
partition is too small because of an increasing number of bad
sectors.

Error: Too many error exist in the Phoenix
NoteBIOS (tm) Save to Disk partition. Check your
hardware configuration and rerun PHDISK.

First Two Sectors Bad

The following text is displayed when the Save to Disk partition cannot be used.

```
Error: The first two sectors in the Save to Disk
partition are both unusable. This disk is
unsuitable for the Phoenix NoteBIOS Save to Disk
feature.
```

Execute PHDISK /PARTITION /DELETE, and PHDISK /PARTITION /REFORMAT.

PHDISK /CREATE Failed to Execute

The following text is displayed when no Save to Disk partition exists, or the partition table on head 0, cylinder 0, sector 1 is corrupted.

```
Error: The Phoenix NoteBIOS (tm) Save to Disk
partition doesn't exist or the hard disk partition
table on head 0, cylinder 0, sector 1 is
corrupted. Invoke PHDISK/CREATE to create the Save
to Disk partition.
```

Execute PHDISK /PARTITION /CREATE.

Good Sector Map Corrupted

The following text is displayed when a Save to Disk partition exists, but the GSM is corrupted.

```
Error: The "good sector map" (GSM) in the Phoenix
NoteBIOS Save to Disk partition is bad. Invoke
PHDISK /REFORMAT to rebuild this table.
```

Execute PHDISK /PARTITION /REFORMAT to reset the GSM flags.

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Not Enough System Memory

The following text is displayed when not enough system memory is available to run PHDISK.

```
Error: Couldn't allocate additional memory
required to execute PHDISK.
```

Add more system memory, then attempt to try the PHDISK command again.

File Already Exists

The following text is displayed when the PHDISK /FILE /CREATE command is entered, and a Save to Disk file already exists.

```
Phoenix NoteBIOS 4.0 (tm) Save to Disk Preparation Utility
Copyright (c) Phoenix Technologies Ltd. 1995  All rights Reserved

Save to Disk file information:
    Partition starts at sector xxxxx (head xx, cylinder xx, sector xx)
    Partition size. xxxx KBytes total

Current System Status:
    Your Save to Disk file is named C·\SAVE2DSK BIN and has a size
    of xxxx KBytes  It has System, Hidden, and Read Only attributes

The system will now be reset to allow the BIOS to
recognize the cahnges. If the System fails to reboot,
please reset the System manually.

Press any key to reset the system  ..
```

Delete the current file, using PHDISK /FILE /DELETE, before creating another Save to Disk file.

Appendix C: Specifications

This appendix lists the system specifications, including general, mass storage, video system, TouchPad, electrical, mechanical, operating environment, and software specifications. It also presents specifications for system options.

General

CPU:	Intel P54C
	Intel P54LM
Core Logic Chips:	ACC 2056
I/O Chip:	NS PC87334VLJ
System ROM:	150ns
	256K Flash ROM
System DRAM:	70ns
	8MB standard; 24MB maximum
PCMCIA Sockets:	• Two PCMCIA type II connectors or one PCMCIA type III connector
	• Full ExCA implementation of PCMCIA 2.1/JEIDA 4.1 standards:
	• Support for the memory-saving execute-in-place standard (XIP)
Keyboard:	Sunrex K920428 (85/86 keys)
Sound Chip:	ESS 688/1688

Keyboard Controller:	Intel 80C51SL
I/O Ports:	• Serial Port (1), RS-232 9-pin male connector • Parallel Port (1), 25-pin female connector • External Keyboard Connector (1), 6-pin mini-DIN • VGA Connector (1), 15-pin female • Docking Port (1), 240-pin female
System Status Icons:	• AC Power • Battery • Num Lock • Caps Lock • Scroll Lock • Pad Lock • HDD • FDD • PCMCIA • Suspend
TouchPad/Stick Pointer/Trackball:	PS/2 type
Battery:	NiMH 2800mAh x 10

Mass Storage

Hard Disk Drive

Standard Capacity:	340MB
Optional Capacity:	540MB, 720MB, 810MB
Type:	2.5" (MCC Specification)
Height:	19.05 mm or lower

Floppy Disk Drive

Media Type/Capacity:	3.5", 1.44MB
Height:	12.7 mm

Video System

Display:	Dual-scan STN color LCD
	TFT color LCD
Video Controller:	C&T 65545
Video Standard:	VGA
Data Path:	32-bit VESA Local Bus
Resolutions & No. of Colors:	LCD: 640x480, 256 colors
	CRT: 1024x768, 256 colors
Video DRAM:	70ns, 1024KB
LCD active area:	Color STN: 10.4"
	Color TFT: 9.5"
LCD resolution:	640x480

TouchPad

Area:	46 mm x 63 mm
Resolution:	250 ± 10% dpi
Number of buttons:	2

Electrical

AC Adapter:	Input -- 100 ~ 240 VAC
	Output -- 19V±5% with 2.2A current limit, 34W
DC/DC Converter (main module):	Input -- 9 ~ 20V (battery or adapter)
	Output -- +5V (5V±5% 0 ~ 3A)
	+3.3V (3.3V±5% 0 ~ 3A)
	+12V (12V±5% 0 ~ 600mA)
	V_{DD} (5V±5% 0 ~ 500mA)
DC/DC Regulator (2.5/2.9V module):	Input -- +5V
	Output -- 2.5/2.9/3.3V, 3A Max
Inverter:	Input -- 9 ~ 20V
	Output -- In accordance with the LCD spec.
	V_{EE} (±14 ~ 30V adjusted by function keys)
Frequency:	Minimum -- 47Hz
	Maximum -- 63Hz
Maximum Power:	34W

Phase:	Single, three-wire	
Battery:	Voltage:	12V/pack
	Recharge time:	120 mins. for NiMH 2800mAh
	Battery life:	2 hours
External Battery Charger:	Charge current:	2.2A
	Charge time:	2800mAh, 120 mins.

Mechanical

Size	STN color LCD machine: 290mm (W) x 220mm (D) x 49mm (H). [11.4" (W) x 8.7" (D) x 1.93" (H)]
	TFT color LCD machine: 290mm (W) x 220mm (D) x 51mm (H) [11.4" (W) x 8.7" (D) x 2.01" (H)]
Weight.	STN color LCD machine: 2.8Kg (6.17 lbs.)
	TFT color LCD machine: 2.8Kg (6.17 lbs.)

Operating Environment

Temperature:	System On:	5° to 35° C
	System Off:	-20° to 60° C
Humidity	System On:	30% to 95% non-condensing
	System Off:	5% to 95% non-condensing
Maximum Altitude:	3,440 meters	

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Software Specifications

System Software

System BIOS:	Phoenix
Video BIOS:	Chips & Technologies
Supported Operating Systems:	DOS, Windows, OS/2, SCO Unix
Standard Software Drivers	TouchPad driver, VGA drivers, PCMCIA driver, PMU driver, Sound drivers

Power Management Modes

Normal Mode:	All clocks run at full speed; all peripheral devices have power.
Idle Mode:	The CPU clock and some other clocks have reduced frequency.
Standby Mode:	The CPU clock and some other clocks have reduced frequency; the video circuitry and the HDD are in low-power mode.
Suspend:	Most of the components in the system are off; the video circuitry is in low-power mode.

Options

RAM Modules:	8MB, 16MB
Docking Station:	Includes the following:

- Slots for ISA and PCI expansion cards
- External keyboard connector
- Serial ports (2)
- External floppy disk drive connector
- Printer port (Centronics)
- VGA connector
- AC IN connector
- Power switch
- IRDA Data port

Specifications

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